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ADMINISTRATIVE AND INSTRUCTIONAL ADJUSTMENTS RESULTING FROM THE USE OF PROGRAMED MATERIALS.

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A SURVEY WAS CONDUCTED AMONG KNOWLEDGEABLE PERSONS WHO INDICATED AND EVALUATED THEIR PRACTICES AND ADJUSTMENTS IN THE USE OF PROGRAMED MATERIALS. RESPONSES TO QUESTIONNAIRES WERE RECEIVED FROM APPROXIMATELY 400 TEACHERS, ADMINISTRATORS, AND RESEARCHERS. FROM AN ANALYSIS OF THE DATA AN ATTEMPT WAS MADE TO EVALUATE EFFECTIVE INSTRUCTIONAL PRACTICES. TEACHERS WERE PLACED INTO GROUPINGS ARRANGED FROM MOST EFFECTIVE TO LEAST EFFECTIVE USERS OF PROGRAMED MATERIAL. THE CONCLUSIONS REACHED WERE--(1) THERE WAS COMMON AGREEMENT CONCERNING THE EFFECTIVE IMPLEMENTATION AND USE OF PROGRAMED MATERIALS, (2) THE ADJUSTMENTS INVESTIGATED RECEIVED STRONG ENDORSEMENT, AND (3) THE QUALITY OF THE INTERPERSONAL ENCOUNTER WAS CONSIDERED THE MOST IMPORTANT FACTOR IN THE LEARNING PROCESS. SUGGESTIONS WERE THAT RESEARCH PLACE MORE EMPHASIS ON TECHNIQUES TO MEASURE THE QUALITY OF INTERPERSONAL ENCOUNTER. THIS WOULD ALLOW ATTITUDES OF PERSONS TO BE IDENTIFIED. (RS)

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ADMINISTRATIVE AND INSTRUCTIONAL ADJUSTMENTS RESULTING FROM THE USE OF PROGRAMMED MATERIALS

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Because of unforeseen program developments, Dr. Konick and Dr. Dershimer, the initial principal investigators, requested that the U.S. Office allow the grant to be directed by the present investigators. The advice and encouragement of Dr. Konick and Dr. Dershimer have been of valuable assistance to the writers.

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CHAPTER I

OVERVIEW AND LIMITATIONS

The primary purpose of this investigation was to identify the administrative and instructional practices and adjustments concomitant to the use of programmed instruction in the schools of Pennsylvania.

GENERAL DESIGN: A survey of all public elementary and secondary schools in Pennsylvania was made in 1962 to identify schools using programmed materials during the 1962-63 school year. In early October, 1962, a survey questionnaire was mailed to 119 persons knowledgeable in the use of programmed materials to determine the administrative and instructional procedures and adjustments needed or recommended for the effective use of programmed instruction. The data from this questionnaire were used to structure subsequent questionnaires for administrators and teachers who were currently using programmed materials.

Teachers and administrators were requested in their respective questionnaires to indicate if they had followed particular procedures or made certain adjustments in their use of programmed materials, and also to give their assessment of each particular practice and adjustment. The analysis of the data from the returns of the 230 teachers, 84 administrators, and 89 knowledgeable persons was the primary purpose of this study.

After completing the primary purpose, an attempt was made to evaluate the hypothesized modes of effective instructional practice. On the basis of questionnaire scores, teachers were placed on a continuum from "most effective" to "least effective" users of programmed material. Several strategies were employed to test the hypotheses.

LIMITATIONS OF THE STUDY: As in many surveys of this type, some relevant questions were not asked by the investigators--not because of neglect, but because of ignorance of the relevant issues.

With the exception of the national polling of authoritative judgment from recognized leaders in the area of programmed instruction, the study was confined to public schools, teachers, administrators, and students of Pennsylvania.

Schools were eliminated from consideration if they had less than twenty students within the school district involved in programmed instruction. Programmed instructional materials were defined to include only those programs commercially available. A complete listing of the programs considered in this study can be found in Appendix B, Table B5.

The attitudinal questionnaires administered to the students were not subjected to statistical tests for reliability and validity.

Probably the most severe limitation of the present study is the variety, and especially the quality of programmed materials presently available. To ascertain the attitudes and opinions of teachers and administrators concerning programmed instruction, it would appear to be most defensible to limit the dimensions of inquiry to specific programs rather than to "programmed instruction" in general. That is, the assessment of Program X may be entirely different from the assessment of "programmed instruction."

More than seventy-five per cent of the "knowledgeable persons" in the present study agreed that the "crucial factor limiting the use of programmed instruction was the lack of good, validated programs!" When the programmed instruction teachers in this study were questioned concerning their attitudes and evaluation of programmed instruction, they probably responded on the basis of their background and experience in the use of a particular program. If the programs had been of a quality nature, the probability of favorable assessment and positive reaction would, in all likelihood, have been increased. The present study made no attempt to factor out "quality programs" since there were, to the best of the investigators' knowledge, no professionally recognized criteria available for the systematic evaluation of programs, and especially quality programs.

A second major limitation of the study, as perceived by the investigators, is the insidiousness of questionnaire data. These data constantly suggested avenues for more careful investigation, but seldom provided the power for further analysis. Approximately every question on the questionnaire (as the reader will quickly discover), taken alone, offers a fruitful investigation.

This study must be viewed as a descriptive investigation even though attempts were made to test certain hypotheses. It is the opinion of the writers that the hypotheses posed in the second phase of the study must be investigated in a far more structured manner, with more powerful and varied assessment procedures, if responsible and reasonable inferences are to be made concerning effective classroom utilization of programmed media.

This issue became so important in the minds of the investigators that a much more comprehensive and structured research proposal was submitted on February 1, 1963, to the U.S. Office of Education, Title VII, for support. This proposal was approved by the U.S. Office of Education, and its objective was as follows:

> To systematically investigate and evaluate five selected combinations of the teacher and programmed materials to determine if there is a combination (or combinations) of teacher and program that affords the most productive instructional interaction of these two instructional agents.[1]

However, for the over-all purpose of the present study, the identification of administrative and instructional practices, problems, and adjustments associated with the use of programmed instruction, the investigators feel that they have reported some valuable and useful information to the field in general, and particularly, to the school administrators and teachers who are currently using programmed materials or wish to introduce programmed instruction to their students.

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[1] The Teacher, Programmed Materials, and Instructional Interaction: An Assessment of Five Selected Conditions of Teacher and Program Integration.
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Principal Investigator: N. Sidney Archer

CHAPTER II

IDENTIFICATION OF ADMINISTRATIVE AND INSTRUCTIONAL ADJUSTMENTS

This section of the study was structured into seven sequential phases. The completion of each phase was contingent upon the data from previous phases.

During the first phase of the study, the investigators identified those schools that had indicated they were using programmed materials. The second phase identified persons whom the investigators considered to be "knowledgeable" in the use of programmed materials. Phase III involved the development of a questionnaire for the "knowledgeable" persons (Appendix D). The responses from this group assisted in the development of questionnaires for teachers (Appendix F) and administrators (Appendix E). These questionnaires, developed in Phase IV, were distributed to selected teachers and administrators in Pennsylvania.

Phase V, the visitation to schools, made it possible to determine whether the data on the completed questionnaires were a valid representation of how these schools and teachers were actually using these materials. Phase VI dealt with reliability of questionnaire data, and Phase VII covered the analysis and tabulation of the responses.

Phase I - Identification of schools using programmed instructional materials

Phase I of the study identified the public school administrative units in Pennsylvania using programmed materials during the 1962-1963 school year.

A tentative list of these administrative units was obtained from the Bureau of Research of the Pennsylvania Department of Public Instruction which had recently completed a survey of current educational practices being used in the Commonwealth. In order to identify additional administrative units, (1) an article describing the study, as well as requests for the identity of schools using programmed materials, appeared in the October, 1962 issue of the Pennsylvania Department of Public Instruction Newsletter, and (2) publishers of programmed materials were requested to identify schools in Pennsylvania using their materials.

A letter of inquiry was mailed September 26, 1962 to all administrative units identified by the above procedures, to confirm their use of programmed materials for the 1962-63 school year.

The results of this inquiry indicated that 136 public school administrative units in Pennsylvania were using or planning to use these materials during the 1962-1963 school year. These 136 administrative units constituted approximately fifteen per cent of the public school administrative units in Pennsylvania.

Table I shows each administrative unit according to the total enrollment and the number of students using these materials.

TABLE I

PENNSYLVANIA PUBLIC SCHOOL ADMINISTRATIVE UNITS USING PROGRAMMED INSTRUCTIONAL MATERIALS, 1962-63

Total Administrative Unit Enrollment

	Number of Students Using	1-2999	3000-5999	6000 or more	Total
	1-19	11	5	1	17
	20-39	12	8	1	21
	40-59	5	6	2	13
	60-79	10	11	2	23
	80-99	2	2	1	5
i=20	100-119	5	3	2	10
	120-139	1	3	2	6
	140-159	6	2	2	10
	160-179	0	1	0	1
	180-199	2	3	1	6
	200-299	9	2	2	13
	300-399	3	0	1	4
	400-499	0	0	0	0
	500-599	2	0	0	2
	600-699	0	1	0	1
i=100	700-799	0	0	1	1
	800-899	0	1	0	1
	900-999	0	1	0	1
	1000 or more	0	0	1	1
	Total	68	49	19	136

Phase II - Identification of persons "knowledgeable" in the use of programmed materials

The second phase of the study sought to identify persons "knowledgeable" in the use of programmed materials. By means of a questionnaire (Phase III), these persons assisted in establishing criteria for the effective use of these materials.

Unfortunately, no list of "knowledgeable" persons could be obtained from any agency or individual. Sources contacted were the U.S. Office of Education, National Education Association, and The Center for Programed Instruction.

The literature on programmed instruction was reviewed to obtain the names of prominent persons associated with programmed instruction. The names of 119 were arbitrarily selected from those who could be classified as "knowledgeable" in the use of these materials. The list of persons identified comprised experimental psychologists, researchers, programmers, publishers, and administrators. These persons represent institutions in twenty-six different states.

These "knowledgeable" persons, with the exception of the administrators, have all written articles or reported research findings on programmed instruction in various professional magazines, journals, and books. The twenty-eight administrators in the group have used programmed instructional materials in their schools for a minimum of one school year.

"Knowledgeable" persons are listed in Appendix C.

Phase III - Development of a questionnaire for "knowledgeable" persons

Having identified 119 persons "knowledgeable" in the use of programmed instructional materials, it was then necessary to structure an instrument for these persons that would elicit the kind of data that would be most valuable for the study.

To ascertain further the administrative problems in the implementation of programmed materials, three schools were visited. The staff talked to administrators and teachers using these materials. Additional information was obtained by conferences with Dr. J. William Moore of Bucknell University, and Dr. Robert Glaser of the University of Pittsburgh; members of the Pennsylvania Department of Public Instruction; and The Pennsylvania State University faculty.

The questionnaire was developed to obtain data concerning:

1. Administrative adjustments that were considered essential, desirable, nonessential, and not recommended.

2. Agreement or disagreement on proposed administrative adjustments.

3. Teacher's role in the use of these materials.

4. Defensible procedures for evaluating pupil performance when using programmed materials.

5. Crucial factors limiting the use of these materials in public schools.

The questionnaire was field tested by mailing it to five persons who were on the list of "knowledgeable" persons. The revised questionnaire was mailed on October 18, 1962 to the 119 "knowledgeable" persons.

Follow-up letters which included another copy of the questionnaire, were mailed November 14, 1962 to all "knowledgeable" persons who had not responded as of that date. The final tabulation indicated that 86.6 per cent (103 out of 119) returned the questionnaire. Of the 103 who responded, fourteen did not complete the questionnaire. Thus, 74.8 per cent (89 out of 119) returned usable questionnaires. The questionnaire is given in Appendix D.

Phase IV - Questionnaires for administrators and teachers using programmed materials in the selected schools

Phase IV of the study details the development of the questionnaires to be mailed to the chief school administrators and the teachers using programmed materials in the 119* selected school systems.

Following a period of writing, field testing, and revision, a conference was held with members of the consulting advisory staff for their criticism. With suggested changes, further field testing of the questionnaires was conducted in two school systems. The questionnaires were revised and approved following visitation of these two schools.

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* The 119 selected school administrative units should not be confused with the 119 "knowledgeable" persons referred to in Phases II and III. The 119 selected school administrative units were selected (out of 136 administrative units identified as using or planning to use programmed materials) because they had involved a minimum of twenty students in programmed instruction, as stated in the limitations in Chapter I.

The questionnaires were in two parts. The first part dealt with whether or not certain administrative adjustments had been made in the school system. In addition, it required the respondent's assessment of the effectiveness of these adjustments in terms of "Highly Essential" or "Nonessential." The second part was an attitudinal survey pertinent to programmed instruction.

On January 14, 1963 the questionnaires were mailed to the chief school administrators and teachers using programmed materials in the 119 selected school administrative units. The questionnaires are included in Appendixes E and F.

Follow-up letters were mailed February 2, 1963 to those administrative school units that had not responded as of that date. In the final follow-up, telegrams were sent February 14 to eleven school administrative units that had not responded to the questionnaires.

In the final tabulation, 100 per cent of the 119 administrative units returned the questionnaires, of which 84 per cent were usable. The remaining 19 school units indicated that they could not react meaningfully because of lack of experience with programmed instruction. The names of the school administrative units included in the study are listed in Appendix G.

Phase V - School visitations for validation of questionnaires

Schools were visited to determine if responses on the questionnaires by administrators and teachers were in agreement with their responses in a structured interview situation. The purpose of these interviews was to ascertain if teachers and administrators would report verbally in informal - yet structured - classroom interview situations, the same information that they had reported on the questionnaire. The investigators realized that the most rigorous questionnaire validation procedure would have been to observe systematically teacher and student classroom interaction and performance. Unfortunately, reality factors of limited time, finances, and personnel necessitated the aforementioned interview schema.

The school administrative units (N=11) were selected for the purpose of interviewing students, teachers, and administrators who were representative of different (1) geographic locations, (2) total student enrollments, and (3) numbers of students using programmed materials. The eleven school administrative units represent eleven per cent of the schools and ten per cent of the teachers who participated in the study.

During the site visitations, pertinent interview data were recorded on a check list developed from critical items on the questionnaires. The list is given in Appendix H. The questionnaires and check lists of the administrators were grouped and processed separately from those of the teachers.

In order to determine agreement between administrator and teacher reports (questionnaire data) and their subsequent interview behavior (check list data), a simple percentage of agreement was computed for each of the fifteen check list items.

Table II indicates that subsequent interview responses of the teachers were congruent with questionnaire responses in 90.1% of the total check list items. This compares with 76.9% of the administrators.

The Chi-square technique indicates that teacher questionnaire responses were significantly more congruent with interview behavior (.05) than were those of administrators.

The inference is made that this sample of administrators and teachers represents the parameter of administrators and teachers in the study; consequently, the questionnaire data accurately reflect the teachers' and administrators' perception of their utilization of PIM.

Phase VI - Reliability of questionnaire data.

In an attempt to determine its reliability, the questionnaire was readministered four months later to a random sample of 51 teachers. Of the 49 questionnaires returned (88%), 46 were usable. The questionnaires were scored to yield an "effective use" value which correlated .54 with the original "effective use" value.

In addition, the attitudinal section of the teacher questionnaire was checked item by item to determine the amount of agreement between the original questionnaire responses and those made four months later. Table III indicates, for each questionnaire item, a rather low percentage of exact agreement between responses for the two administrations of the questionnaire. However, when the "Strongly Agree" and "Agree" categories were collapsed into "Agree" and the same was done to the "Disagree" alternatives, the stability increased to a respectable level (Table III). This increase becomes more significant when one considers the unusually long interval of four months between the two administrations of the questionnaire.

Phase VII - Analysis of responses to the questionnaires.

The responses of administrators, teachers, and knowledgeables were compared to determine where there were significant differences. The technique employed was the determination of significant differences between independent sample percentages by critical ratio as outlined by Tate.[2] The five per cent level of significance was used. The recommendation aspects of the responses to each item will be discussed in the light of agreement or significant disagreement.

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[2] Merle W. Tate, Statistics in Education, The Macmillan Company, New York, 1955, p.439.

The reader should be cautioned in his interpretation of apparent inconsistencies between the percentages of responses for administrators and for teachers on some items. Because the schools did not have the same number of teachers using these materials, these apparent inconsistencies can occur. For example, Item 1 of Figure 1 reveals that fifty-nine per cent of the administrators (schools) have indicated they had in-service programs prior to using programmed instruction, yet only thirty per cent of the teachers indicated that they had in-service programs. It is very possible that these schools (59% of the administrators) had in-service training for only thirty per cent of the teachers (69 out of 230) involved in the use of programmed instructional materials.

The reader also should be aware that some of the items on the questionnaires could be answered by more than one response; therefore, multiple categories checked produced some percentage totals over 100.

TABLE II

Agreement between Questionnaire Responses and Subsequent Interview Responses for Teachers and Administrators

Check List Item Number	N	Teachers Number Agree	Teachers Percentage Agree	N	Administrators Number Agree	Administrators Percentage Agree
1	22	19	86.4	11	5	45.4
2	22	22	100.0	11	11	100.0
3	22	20	90.1	11	9	81.8
4	22	14	63.6	11	7	63.6
5	22	20	90.1	11	7	63.6
6	22	18	81.8	11	7	63.6
7	22	20	90.1	11	7	63.6
8	22	19	86.4	11	8	72.7
9	22	18	81.8	11	7	63.6
10	22	21	95.4	11	11	100.0
11	22	22	100.0	11	10	90.9
12	22	20	90.1	11	8	72.7
13	22	21	95.4	11	9	81.8
14	22	21	95.4	11	8	72.7
15	22	22	100.0	11	9	81.8
Total	330	297	90.1	165	127	76.9

TABLE III

Reliability of Responses on Two Administrations of the Attitudinal Section of the Teacher Questionnaire
(N=45)

Item Number	(1) Identical Responses		(2) Similar Responses	
	N	Percentage	N	Percentage
1	29	64.4	40	88.8
2	25	55.5	35	77.7
3	34	75.5	39	86.6
4	28	62.2	36	80.0
5	32	71.1	38	84.4
6	27	60.0	33	73.3
7	27	60.0	32	71.1
8a	22	48.8	26	57.7
8b	21	46.6	28	62.2
8c	27	60.0	30	66.6
9	36	80.0	36	80.0
10	30	66.6	35	77.7
11	27	60.0	32	71.1
12a	24	63.3	33	73.3
12b	27	60.0	37	82.2
13	27	60.0	32	71.1
14	26	57.7	30	66.6
15	29	64.4	32	71.1
16a	27	60.0	36	80.0
16b	24	53.3	30	66.6
16c	26	57.7	32	71.1
17	27	60.0	36	80.0
18	23	51.1	35	77.7
19	30	66.6	39	86.6
20	25	55.5	35	77.7
21	23	51.5	36	80.0

(1) Identical responses occur when subject is presented with four alternatives ("Strongly Agree", "Agree", "Disagree", "Strongly Disagree") and selects same attitudinal position on both administrations.

(2) Similar responses occur when subject shifts only within "Agree" (Strongly Agree, Agree) or "Disagree" (Strongly Disagree, Disagree) category, but does not shift from one dimension to the other.

CHAPTER III

ANALYSIS AND INTERPRETATION OF QUESTIONNAIRE DATA

The data for the analyses of the questionnaires for teachers, administrators, and "knowledgeable" persons are given in the appendixes of this report. Figures 1 through 6 which are contained in this chapter present the above data in a graphic manner. Each figure presents a series of related questionnaire items and gives a graphic presentation which indicates:

1. percentage of actual school and/or classroom use of the adjustment, technique, practice, etc., called for in the item, and

2. percentage of agreement if the adjustment, technique, practice, etc., called for in the item was considered an important factor in the effective utilization of programmed materials.*

Discrepancies between percentages on 1 and 2 above indicate the gap between the respondents' desired and actual utilization of programmed materials.

This chapter also includes (1) the primary instructional purposes for using programmed materials, and (2) teacher and administrator attitudes concerning the effects of programmed instruction.

Administrative techniques utilized and administrative techniques recommended in the introduction of programmed instruction

The analysis of the data relating to the administrative techniques recommended in the introduction of programmed instruction is summarized and presented graphically in Figure 1.

Item 1. Administrators (59%) and teachers (30%) indicate that they had an in-service program for staff members prior to using programmed materials. Even though there were significant differences among the groups responding, administrators (82%), teachers (69%), and knowledgeables (97%) recommend this technique.

Item 2. Forty per cent of the administrators and thirty per cent of the teachers indicate that consultants in the use of programmed materials were used during these in-service programs. Administrators (61%), teachers (63%), and knowledgeables (93%) recommend that consultants should be used during these in-service programs.

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* "Important factor" for knowledgeable persons is defined as either a response of "Essential" or "Desirable" on their questionnaire, and a response of "Highly Desirable" on the teachers' and administrators' questionnaires.

Significant differences were found when comparing the responses of the administrators or teachers with the responses of the knowledgeables. The knowledgeables agree that in the introduction of this relatively new approach to teaching, consultants should assist schools in the use of these materials.

Item 3. To introduce programmed instructional materials, administrators (89%) and teachers (61%) state that their schools selected only those teachers who were sympathetic to programmed instruction. Administrators (84%), teachers (77%), and knowledgeables (79%) agree that only teachers sympathetic to programmed instruction should be selected to use these materials.

Item 4. Administrators (66%) and teachers (65%) indicate that their schools selected the most competent teachers to use programmed materials. Administrators (57%), teachers (60%), and knowledgeables (48%) recommend this technique.

Item 5. The data suggest that administrators (80%) and teachers (81%) favor selection of teachers who have a thorough knowledge of the programmed subject content. Administrators and teachers not only recommend this technique but indicate they have used it when introducing programmed materials.

Item 6. Generally, administrators (76%) require their teachers to obtain administrative permission before using programmed materials in their classrooms.

Significant differences were obtained when comparing the responses of the knowledgeables (58%) with those of the administrators (76%) and with those of the teachers (73%). One explanation may be that the knowledgeables are not so familiar as the administrators or teachers with some of the problems that can occur in introducing new materials in a school situation.

Item 7. A relatively small percentage of administrators (22%) and teachers (18%) indicate that teachers' workshops or seminar participation are required before teachers use these materials. Slightly over half of the administrators (54%) and teachers (53%) recommend this technique.

The knowledgeables (91%) who differed significantly from the administrators and teachers, recommend teacher workshop or seminar participation. It is possible that administrators and teachers interpreted the workshop or seminar participation to be in addition to the in-service programs (Item 1) which were recommended by all three groups of respondents.

Item 8. Administrators (74%) and teachers (76%) indicate that a staff committee determines and/or selects students to use these materials. Administrators (65%) and teachers (62%) recommend this technique. However, the knowledgeables (27%) differ significantly with the administrators and teachers regarding this technique.

Item 9. The data from this item indicate a significant difference when comparing the responses of the teachers with those of the administrators and the knowledgeables. Administrators (81%) and knowledgeables (88%) recommend that subject-teacher curriculum committees should select the programmed materials. Sixty per cent of the teachers recommend this technique. Forty per cent of the teachers may be saying the individual teachers should be permitted to select the programmed materials for their students.

Item 10. Teachers (91%) and knowledgeables (100%) recommend that programmed materials selected should be based on the educational objectives established by the school for that particular course. However, significant differences were found in comparing the responses of the administrators (76%) with the responses of the teachers and knowledgeables.

Item 11. Administrators (49%) and teachers (57%) believe that it is highly essential for parents to be oriented to the reasons for using programmed instructional materials prior to the adoption of these materials. Approximately one-third of the schools (36%) use this technique.

Item 12. Administrators (95%), teachers (88%), and knowledgeables (85%) agree that it is not necessary to obtain parental permission before a child uses programmed materials. Relatively few schools (5%) obtained parental permission before using these materials.

Item 13. Administrators (94%), teachers (97%), and knowledgeables (98%) strongly recommend that teachers should inform their students of the purpose and use of programmed materials prior to students' using these materials. Administrators (99%) and teachers (97%) indicate that they use this technique in the introduction of programmed materials.

Item 14. Schools not only experimented with programmed materials on a small-scale tryout basis but also recommended that this technique be utilized prior to the school's adoption of these materials. Eighty-eight per cent of the administrators and eighty-six per cent of the teachers indicate they used this technique in the introduction of programmed materials. Administrators (86%) and teachers (85%) recommend the small-scale tryout technique prior to a school's adopting these materials.

Item 15. The data indicate that it is not imperative for the effective use of programmed materials to release a member of the staff from other duties to coordinate and/or supervise the use of these materials. The knowledgeables (57%) have the highest percentage recommending this technique. Twenty-nine per cent of the administrators and forty-six per cent of the teachers indicate that this technique is highly essential for the effective use of programmed materials.

Significant differences were found when comparing the responses of the administrators with those of the teachers and knowledgeables. Administrators believe that their present administrative and supervisory personnel can coordinate and/or supervise the use of programmed materials.

Item 16. Administrators (35%) and teachers (41%) indicate that it is necessary to provide additional storage space beyond the classroom for programmed materials. Responses of the knowledgeables (84%) to this question differed significantly with the responses of the administrators and the responses of the teachers, perhaps for the reason that because schools were using these materials on a small-scale basis, additional storage space beyond the classroom had not yet been needed.

Item 17. A significant difference is indicated between the responses of the knowledgeables (62%) and the responses of the administrators (32%) in recommending a special budget in addition to the regular instructional materials for the purchase of programmed materials. Administrators probably believe that programmed materials are instructional materials and therefore, should be classified in the budget with other instructional materials.

Graphic presentation of the preceding data is given in Figure 1 on pages 17 through 19.

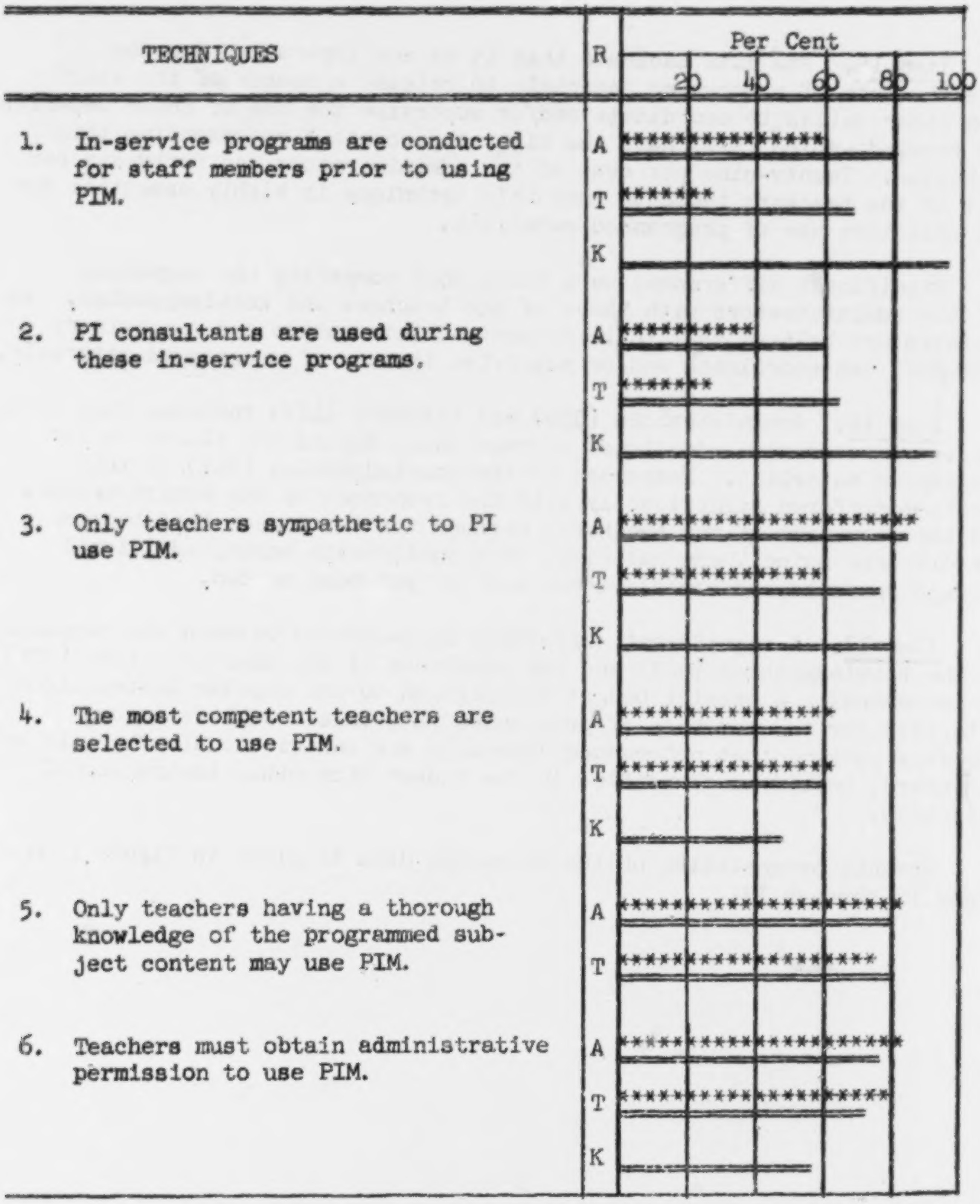
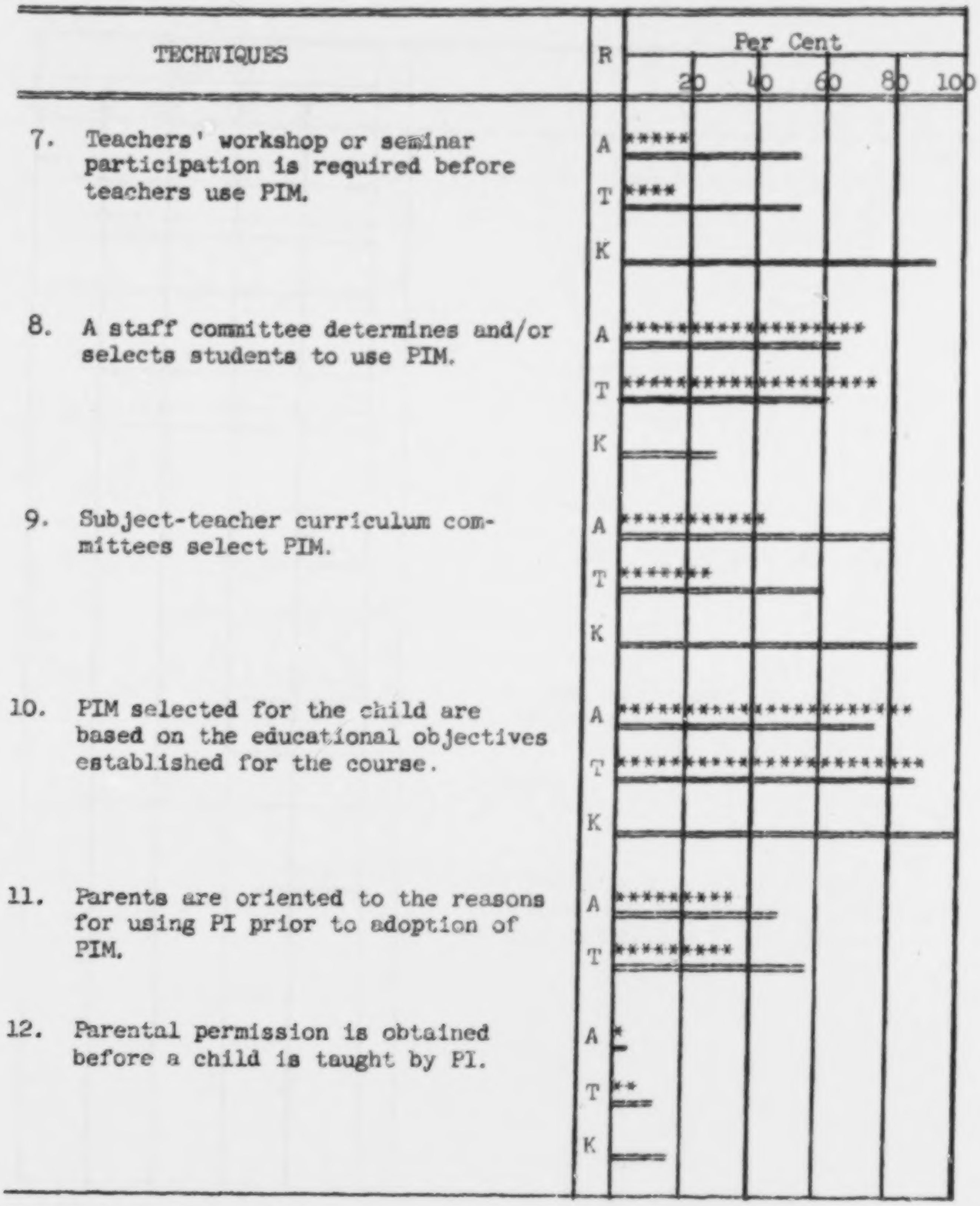


Figure 1. A comparison between the reported administrative techniques and the recommended administrative techniques to be utilized in the introduction of programmed instruction.

Legend:
**** Technique utilized
═══ Technique recommended
PI Programmed instruction
PIM Programmed instructional materials

R Respondents
A Administrators
T Teachers
K Knowledgeables



7. Teachers' workshop or seminar participation is required before teachers use PIM.

8. A staff committee determines and/or selects students to use PIM.

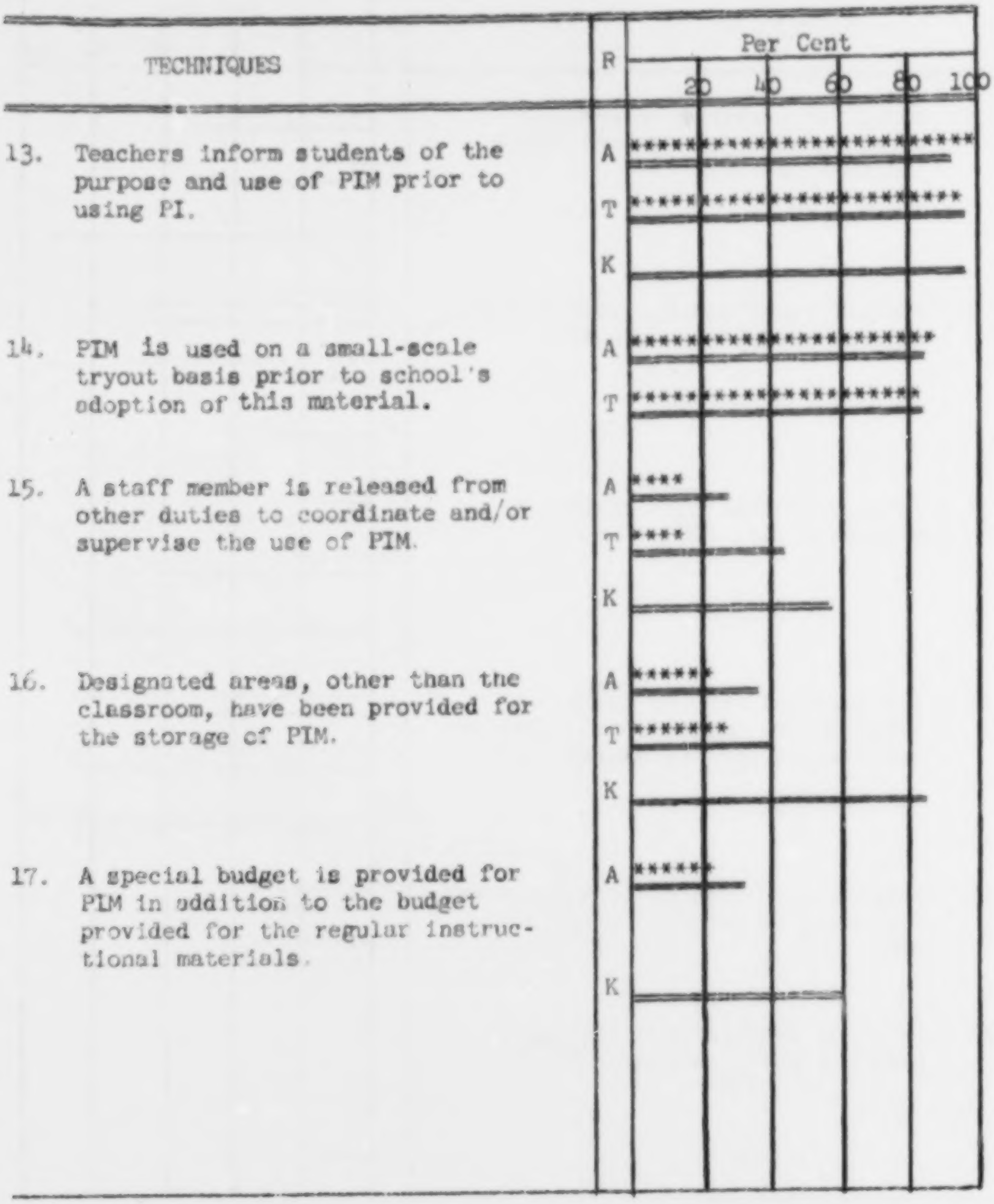
9. Subject-teacher curriculum committees select PIM.

10. PIM selected for the child are based on the educational objectives established for the course.

11. Parents are oriented to the reasons for using PI prior to adoption of PIM.

12. Parental permission is obtained before a child is taught by PI.

Figure 1. Continued



13. Teachers inform students of the purpose and use of PIM prior to using PI.

14. PIM is used on a small-scale tryout basis prior to school's adoption of this material.

15. A staff member is released from other duties to coordinate and/or supervise the use of PIM.

16. Designated areas, other than the classroom, have been provided for the storage of PIM.

17. A special budget is provided for PIM in addition to the budget provided for the regular instructional materials.

Figure 1. Continued

Administrative practices established and administrative practices recommended to provide for students' individual differences

This section of the chapter will discuss the data obtained from items pertinent to student individual differences. The data are summarized and presented graphically in Figure 2.

Item 1. Apparently schools (76%) are using programmed materials whenever appropriate for specific students regardless of the publisher's grade placement. The knowledgeables (99%) strongly recommend this practice; administrators (60%) and teachers (68%) also indicate that this practice is highly essential.

Item 2. The data from the administrators and teachers reveal that only a few schools are using the specific assessment procedures listed in the questionnaires.

Item 2a indicates that a relatively small percentage of administrators (37%) and teachers (33%) state that they use assessment procedures to determine whether students are permitted to eliminate certain units of the programmed materials. Administrators (41%) and teachers (57%) recommend this assessment procedure. Significant difference was found in comparing the responses of the administrators with the responses of the teachers.

Item 2b reveals that administrators (62%) and teachers (71%) believe that assessment procedures should be used to determine the student's readiness for programmed materials.

Item 2c indicates that less than half of the administrators (44%) and teachers (49%) recommend assessment procedures to determine whether or not a student may bypass a specific program. The data suggest that over half of the administrators and teachers believe that it is necessary for students to complete a program regardless of whether they have mastery of content.

Item 2d indicates that administrators (68%) and teachers (70%) believe that assessment procedures should be used by teachers to determine and remedy each student's weakness (es) before he is given programmed materials.

Item 3a. A relatively small percentage of administrators (8%) and teachers (20%) indicate that students start each unit of a program together. Similarly, a relatively small percentage of administrators (22%) and teachers (18%) recommend this practice.

Item 3b. A higher percentage of administrators (52%) and teachers (42%) recommend that students start only the first two or three units of a program together.

Item 4. Administrators (90%) and teachers (89%) believe that students using programmed materials to acquire basic skills and facts should be permitted to progress at a rate appropriate to their individual abilities. All of the administrators indicate that they use this particular practice in their schools.

Item 5. Administrators (68%), teachers (76%), and knowledgeables (91%) indicate that students should be able to advance to the next course (program) upon satisfactory completion of programmed materials regardless of the time expended. Significant differences were noted when the responses of the knowledgeables were compared with those of the administrators and the teachers.

Item 6a. A relatively high percentage of the schools (82%) permitted students to progress at their own rate for the entire program, yet only seventy-one per cent of the administrators and sixty-nine per cent of the teachers recommend this practice. These data are apparently in conflict with those reported in Item 4, above. A possible interpretation is that programs of short duration (3-6 weeks) are appropriate for complete self-pacing, but longer programs need some pace restriction and/or minimum coverage requirements.

Item 6b. Administrators (52%) and teachers (57%) agree that students should be permitted to progress at their own rate for the entire program but each student should complete by a specified date, the materials up to and including a certain frame or section.

Item 6c. Fifteen per cent of the administrators and eighteen per cent of the teachers recommend that students should be permitted to progress at their own rate up to and including the unit test, and at that point, wait for the rest of the class to complete that particular unit test.

Item 6d. A relatively small percentage of administrators (17%) and teachers (19%) recommend that students be permitted to progress at their own rate for only the class period.

Item 7. All three groups of respondents, administrators (67%), teachers (70%), and knowledgeables (72%), agree that course credit should be given to students upon satisfactory completion of programmed materials regardless of the time expended.

Item 8. Administrators (84%) and teachers (84%) agree that students should be required to obtain a minimum score on unit tests before proceeding to the next unit of the programmed materials.

Item 9. The data indicate that teachers assist students with low test achievement much more than they assist students with average or high test achievement. Similarly, administrators(87%) and teachers (93%) recommend that teachers should assist students with low test scores; administrators (77%) and teachers (69%) recommend teacher assistance for students making average test scores; and administrators (47%) and teachers (39%) recommend teacher assistance for students who make high test scores.

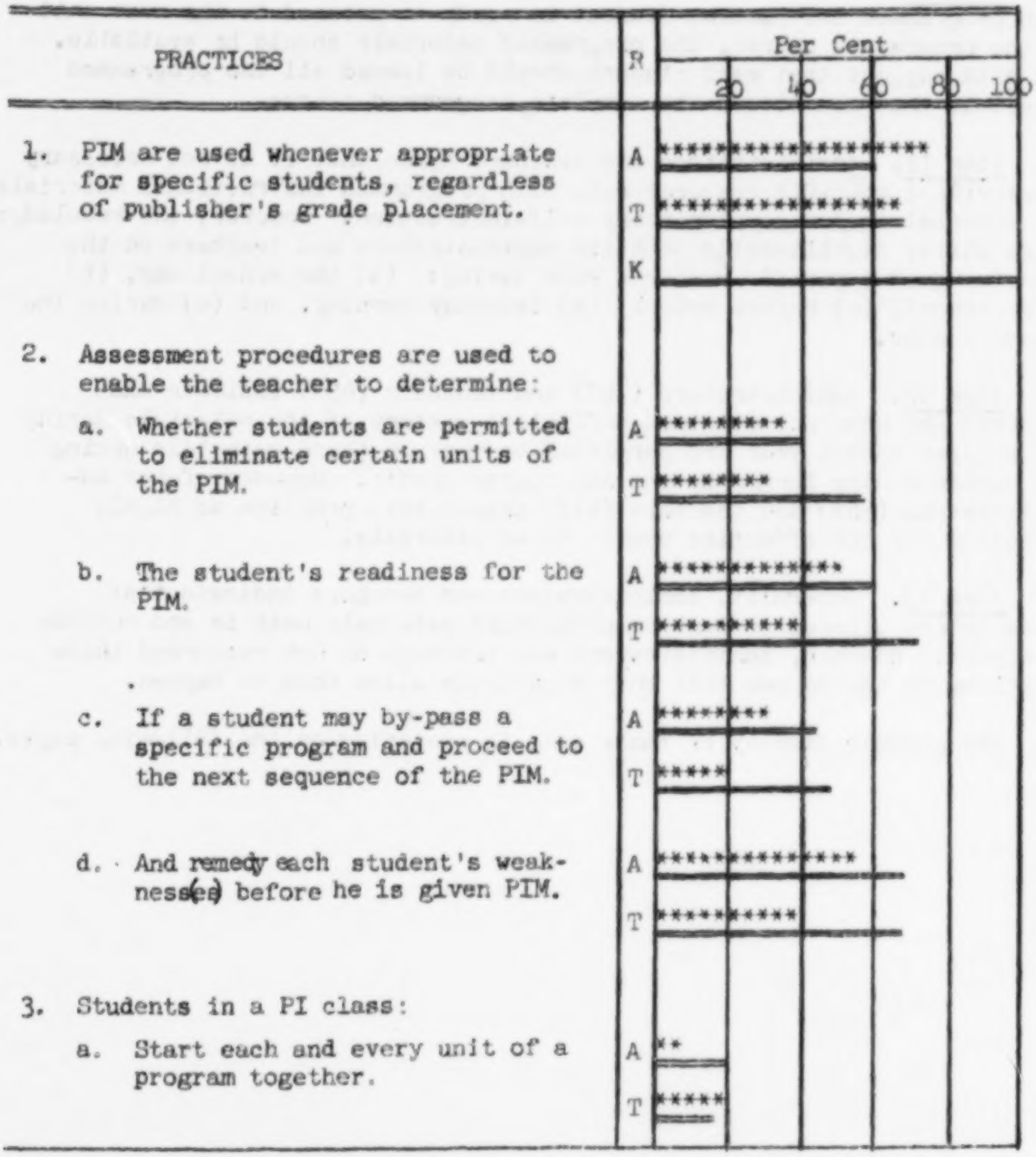
Item 10. Administrators (89%) and teachers (96%) recommend that when each programmed instruction student is ready to proceed to the next unit of the programmed course, the programmed materials should be available. The data suggest that each student should be issued all the programmed materials that constitute the complete programmed course.

Item 11. Administrators and teachers agree that it is not necessary to provide a specific resource room with programmed instructional materials for remedial and/or supplementary self-instruction. However, the knowledgeables differ significantly with the administrators and teachers on the need for such a specific resource room during: (a) the school day, (b) after school, (c) before school, (d) Saturday morning, and (e) during the summer months.

Item 12. Administrators (74%) and teachers (65%) indicate that students who have not attained sufficient mastery of the materials during the regular school year are permitted to work on these materials during the summer months for retesting and course credit. However, fewer administrators (54%) and teachers (47%) assess this practice as highly essential for the effective use of these materials.

Item 13. Generally, administrators and teachers indicate that students are allowed to work on programmed materials both in and outside of school. However, administrators and teachers do not recommend these practices to the degree that they apparently allow them to happen.

The graphic display of these data is presented on the following pages.



1. PIM are used whenever appropriate for specific students, regardless of publisher's grade placement.

2. Assessment procedures are used to enable the teacher to determine:

   a. Whether students are permitted to eliminate certain units of the PIM.

   b. The student's readiness for the PIM.

   c. If a student may by-pass a specific program and proceed to the next sequence of the PIM.

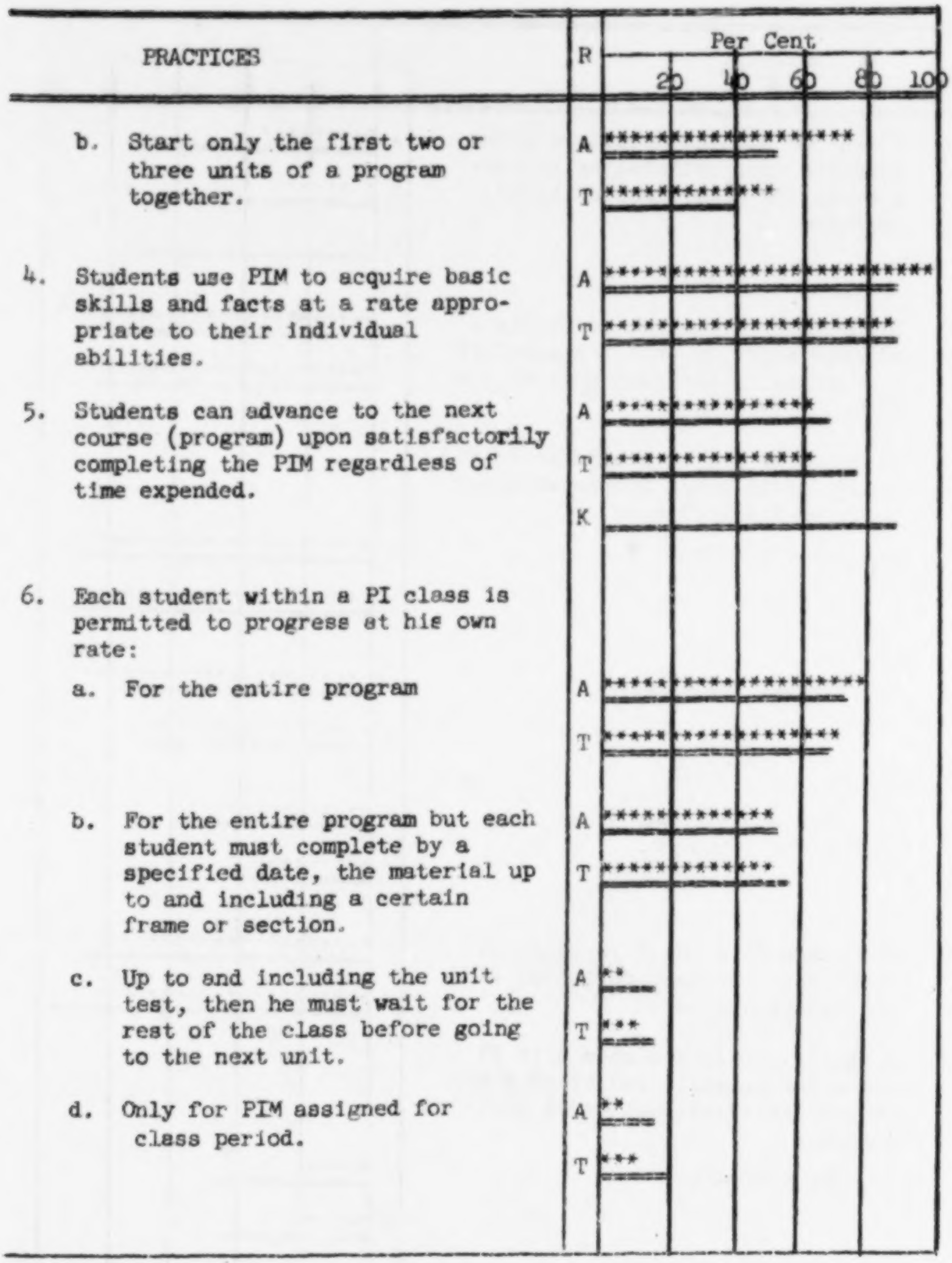
   d. And remedy each student's weakness(es) before he is given PIM.

3. Students in a PI class:

   a. Start each and every unit of a program together.

Figure 2. A comparison between the reported administrative practices and the administrative practices recommended to provide for student individual differences when using programmed instructional materials.

Legend:			
****	Practice established	R	Respondents
═══	Practice recommended	A	Administrators
PI	Programmed instruction	T	Teachers
PIM	Programmed instructional materials	K	Knowledgeables



PRACTICES	R
b. Start only the first two or three units of a program together.	A T
4. Students use PIM to acquire basic skills and facts at a rate appropriate to their individual abilities.	A T
5. Students can advance to the next course (program) upon satisfactorily completing the PIM regardless of time expended.	A T K
6. Each student within a PI class is permitted to progress at his own rate:	
a. For the entire program	A T
b. For the entire program but each student must complete by a specified date, the material up to and including a certain frame or section.	A T
c. Up to and including the unit test, then he must wait for the rest of the class before going to the next unit.	A T
d. Only for PIM assigned for class period.	A T

Figure 2. Continued

PRACTICES	R
7. Course or subject credit is given to students upon satisfactorily completing PIM regardless of time expended.	A
	T
	K
8. Students are required to obtain a minimum score on unit tests before proceeding to the next unit of the PIM.	A
	T
9. PI teachers assist students individually or in small groups whenever test results indicate:	
a. Low achievement	A
	T
b. Average achievement	A
	T
c. High achievement	A
	T
10. When each PI student is ready to proceed to the next unit, the PIM are always available.	A
	T
11. A specific resource room with PI media for remedial and/or supplementary self-instruction is provided during:	
a. The school day	A
	T
	K

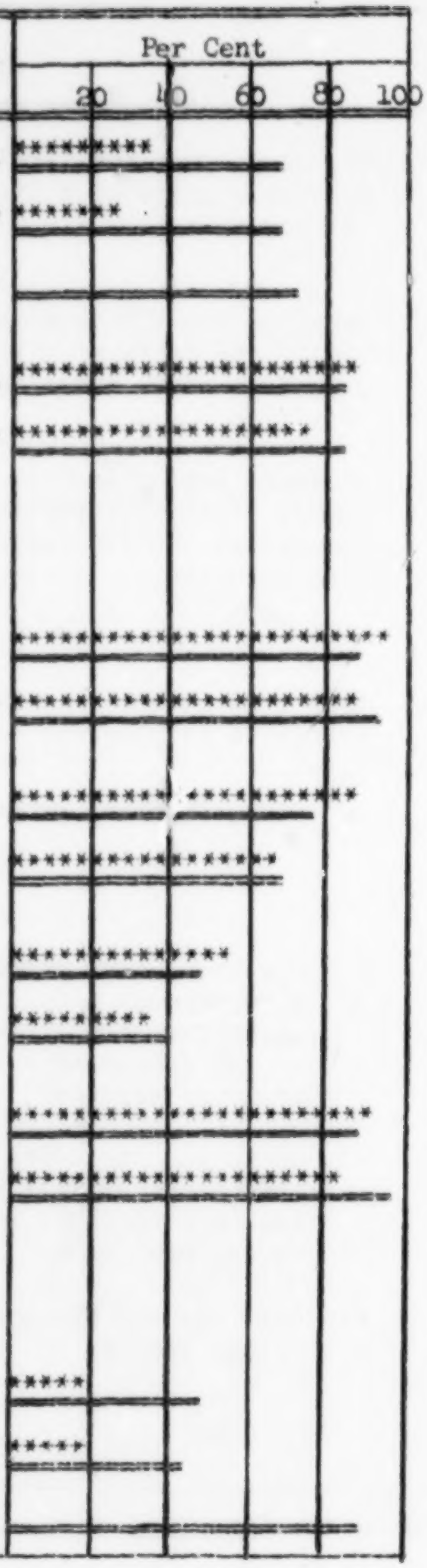
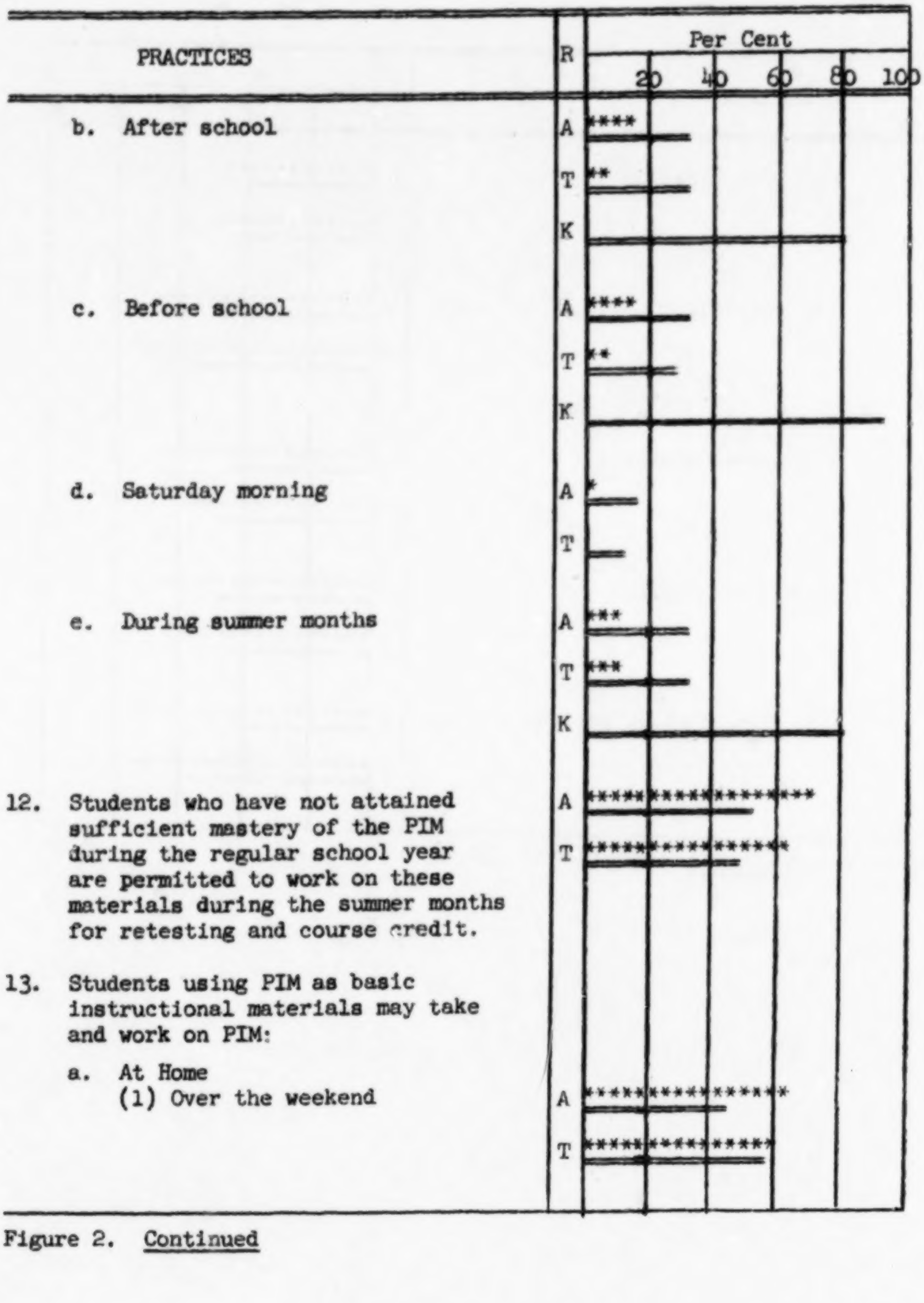


Figure 2. Continued



PRACTICES	R
b. After school	A T K
c. Before school	A T K
d. Saturday morning	A T
e. During summer months	A T K
12. Students who have not attained sufficient mastery of the PIM during the regular school year are permitted to work on these materials during the summer months for retesting and course credit.	A T
13. Students using PIM as basic instructional materials may take and work on PIM:	
a. At Home (1) Over the weekend	A T

Figure 2. Continued

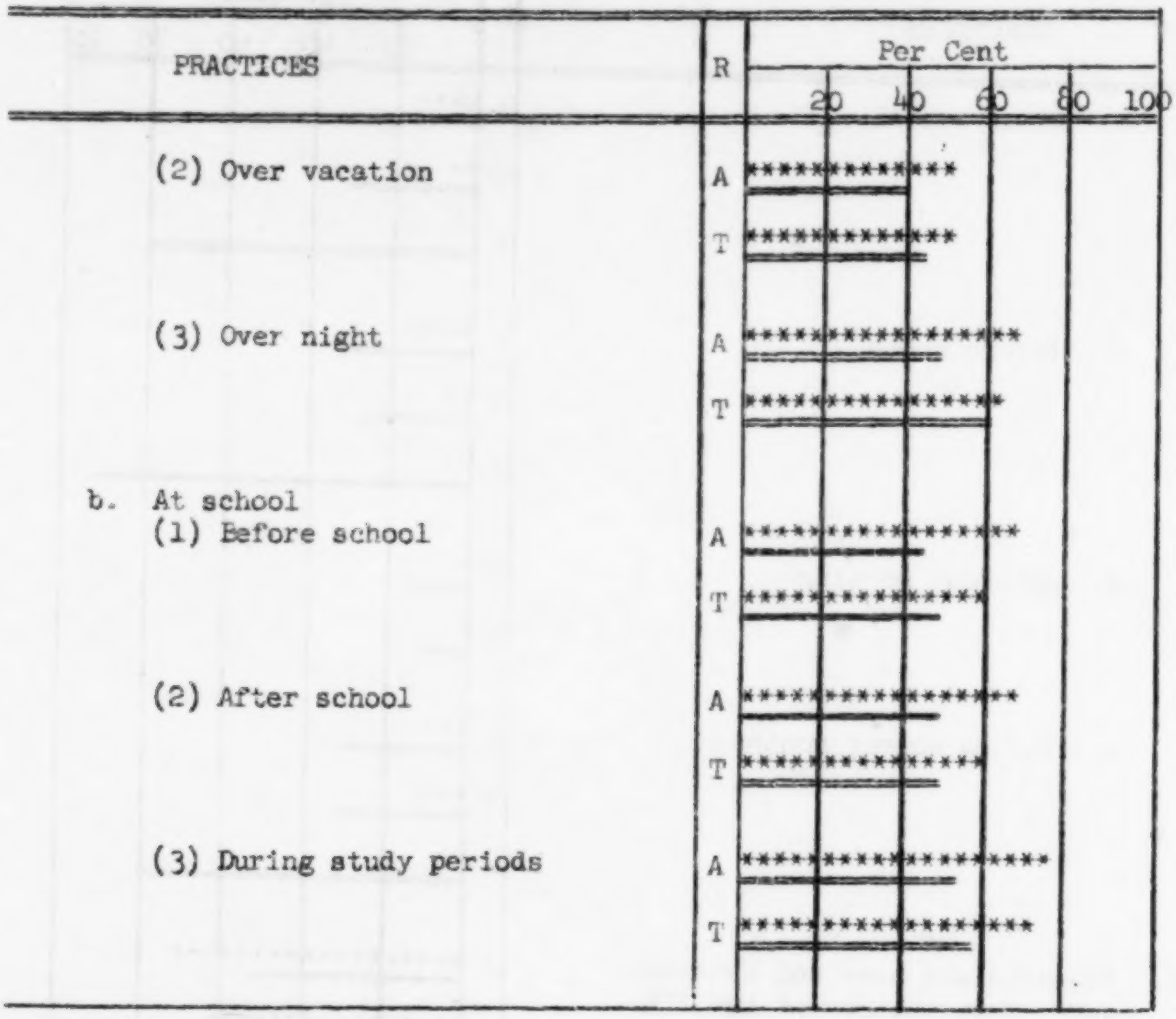


Figure 2. Continued

Administrative methods established and administrative methods recommended for evaluating student progress

Evaluation of the progress of students who are taught by conventional methods has always been a difficult phase of teaching; programmed instruction does not seem to have made evaluation any easier. The following open-ended question was included in the questionnaire sent to the knowledgeable individuals to ascertain their opinions on evaluating student progress when using programmed materials:

> Please describe the most defensible procedure for evaluating pupil performance when programmed materials are being used as the basic instructional medium.

In summary, their responses were:

1. The objectives of instruction are not changed because of the medium used; therefore, the usual evaluation methods apply.

2. Student's growth should be compared with an estimate of his ability to grow. Any comparison of one student's work with that of another student is misleading.

3. Use only programmed materials that have unit achievement tests. These test results should be used along with the results obtained from teacher-constructed and standardized tests.

The analysis of the data relating to the methods established and methods recommended for evaluating student progress is summarized and presented graphically in Figure 3.

Item 1a. Administrators (54%) and teachers (50%) indicate that their students' progress is evaluated on the relationship of the student's expected or predicted performance. Administrators (51%) and teachers (55%) assess this method as highly essential for the effective use of programmed materials.

Item 1b. Administrators (31%) and teachers (34%) recommend that a student's progress be evaluated on the relationship of his performance compared with the rest of the group.

Item 1c. Fifty per cent of the administrators and teachers recommenc that the evaluation of programmed instruction student's progress be based on the per cent of content mastered without considering the group average or the student's ability. The data suggest that student progress should be evaluated on the relationship of his performance to his ability or the per cent of content mastered without considering the group average.

Item 2. Administrators (90%) and teachers (89%) recommend that students be permitted to acquire basic skills and facts at a rate appropriate to their individual abilities. The data tend to support Item 1a.

Item 3 reveals that administrators (84%) and teachers (84%) recommend that students be required to attain a minimum score on unit tests before they are permitted to move on to the next unit of the program. The data tend to support Item 1c.

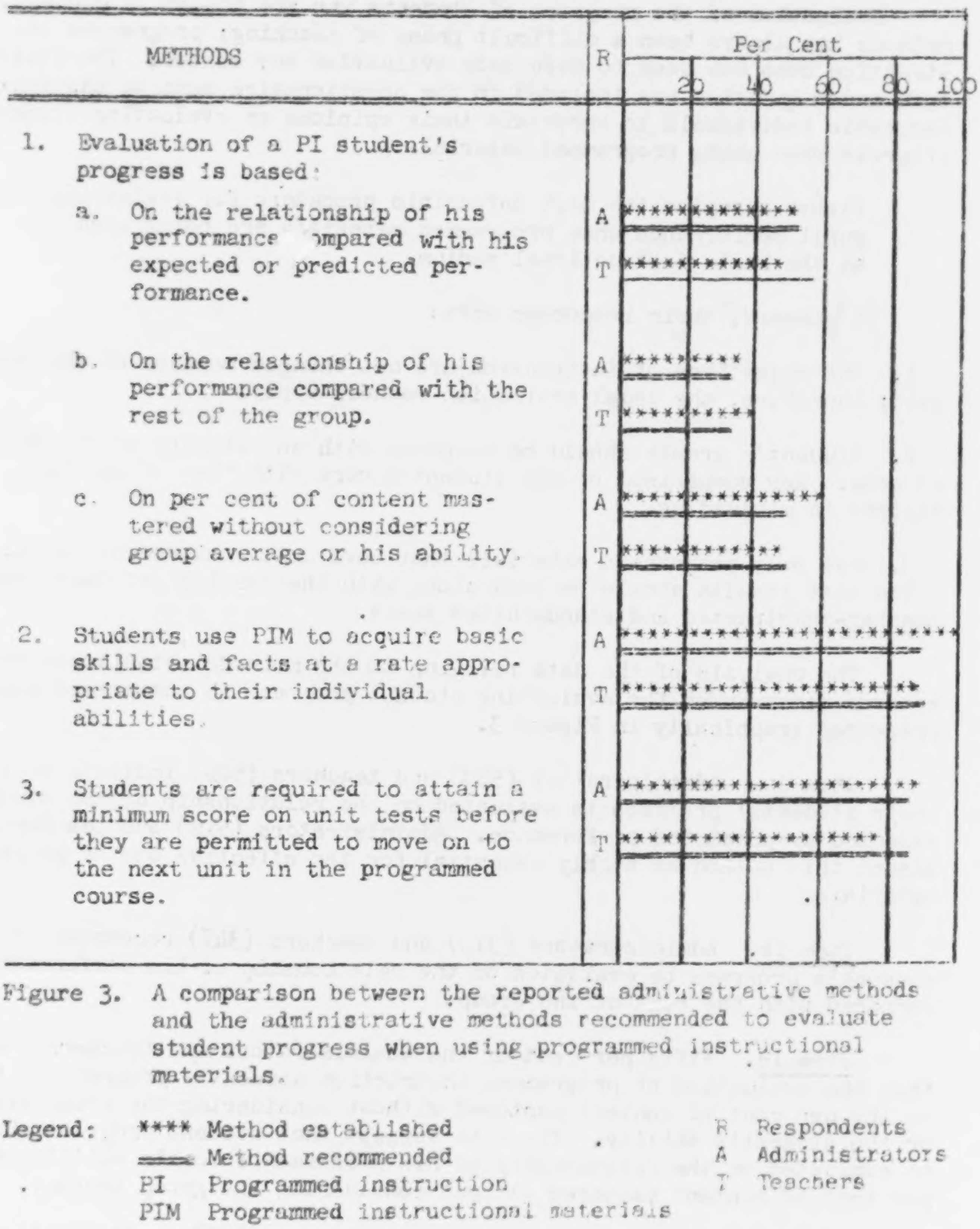


Figure 3. A comparison between the reported administrative methods and the administrative methods recommended to evaluate student progress when using programmed instructional materials.

Legend:

**** Method established

═══ Method recommended

PI Programmed instruction

PIM Programmed instructional materials

R Respondents

A Administrators

T Teachers

Progress report factors used and recommended in reporting student progress to parents

This section of the chapter will discuss the data obtained from the questionnaires pertinent to progress report factors used and recommended in reporting student progress to parents. The data, summarized and presented graphically in Figure 4, suggest that schools have not been using to any great extent reporting factors other than those used in reporting student progress when being taught by conventional methods.

Item 1. The degree of mastery of the content completed appears to be the most used factor of the factors included in the questionnaires. Administrators (44%) and teachers (53%) indicate that they use this factor. Administrators (55%) and teachers (63%) recommend that the degree of mastery of the content completed be used in reporting student progress to parents.

Item 2. Twenty-eight per cent of the administrators and forty-four per cent of the teachers recommend that the degree of mastery of the content assigned be used as a factor in reporting student progress to parents.

A relatively small percentage of respondents recommend the factors listed in Items 3, 4, and 5.

Item 3. Administrators (14%) and teachers (18%) recommend that the number of frames completed appear on the report card.

Item 4. Administrators (16%) and teachers (18%) recommend that the class average of frames completed appear on the report card.

Item 5. Administrators (12%) and teachers (13%) recommend that the class average on each unit test be used on the report card to report student progress.

Two examples of progress report cards being used by one school system in Pennsylvania are included in Appendix I.

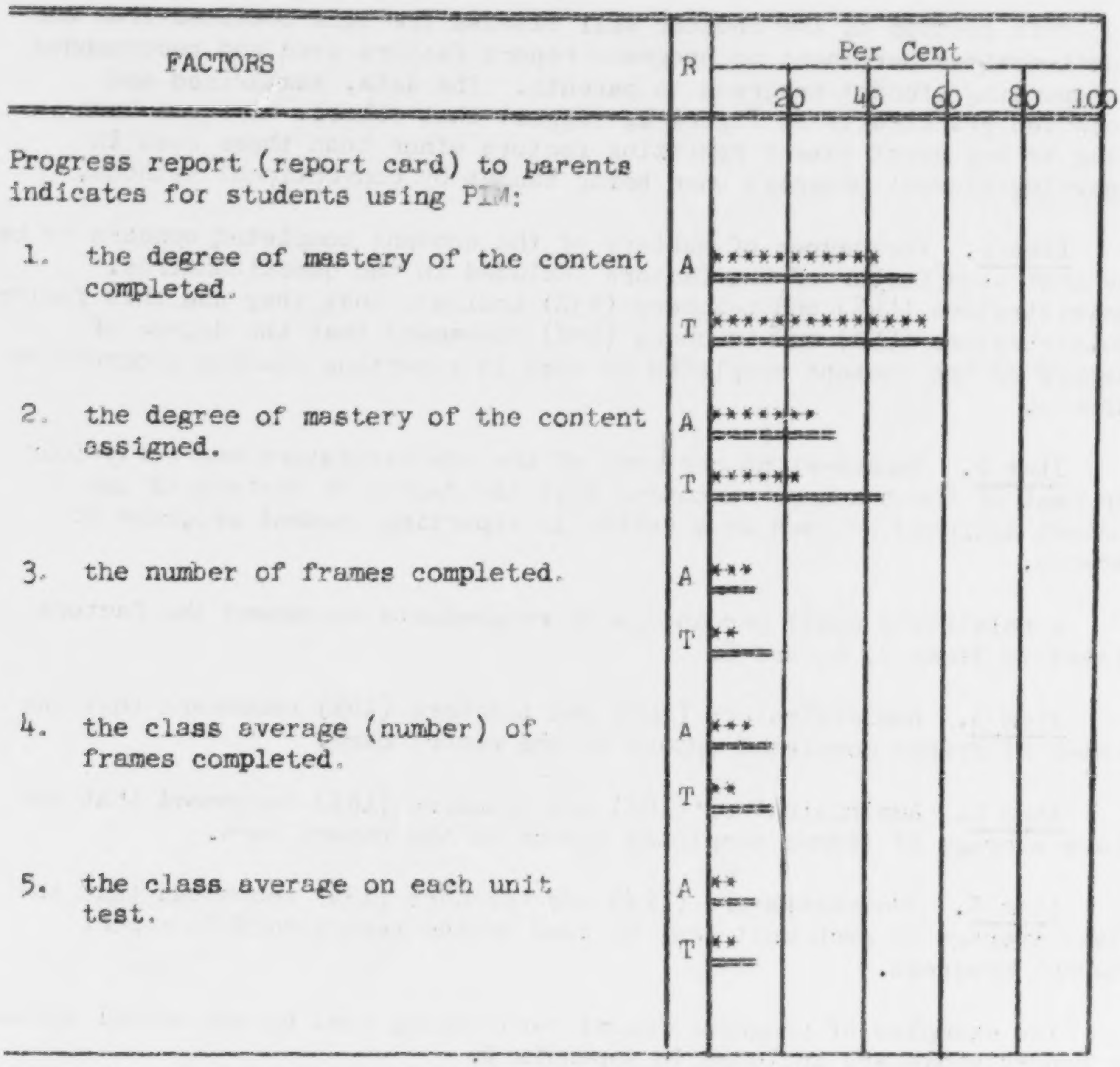


Figure 4. A comparison between the reported administrative factors and the administrative factors recommended in reporting student progress to parents when using programmed instructional materials.

Legend: **** Factor established
═══ Factor recommended
PI Programmed instruction
PIM Programmed instructional materials

R Respondents
A Administrators
T Teachers

Reported teacher roles and recommended teacher roles in using programmed instruction

The role of the teacher, regardless of the methods used, has always been essential for the effectiveness of instruction. Yet there has been no evidence to indicate specifically the role of the teacher when students are using programmed materials.

This section is concerned with reporting (1) roles employed by teachers, and (2) recommended teacher roles as indicated by the respondents. The data are summarized and presented graphically in Figure 5. Percentage comparisons between knowledgeables and teachers -- administrators are not valid since the two groups responded to the items in a different manner. The knowledgeables ranked four specified roles in order of preference while the teachers and administrators responded to each specified role in terms of "yes" or "no", and "recommend" or "not recommend."

Item 1. Respondents believe that a teacher should have an important role when students are being taught by programmed materials. Only five per cent of the administrators and four per cent of the teachers indicate that their students use these materials under the supervision of an unqualified (content) teacher, and a relatively low percentage of administrators (21%) and teachers (33%) recommend this procedure. Of the four possible alternate practices that the knowledgeables ranked, 93% ranked this practice last, and only 1% first.

But what is the combination that affords the most productive educational use of both teacher and program? Three possible roles were included in the questionnaires to ascertain this information.

Item 2. Over half of the administrators (57%) and teachers (59%) indicate that programmed instruction teachers assume the role of only answering questions raised by individual students. However, the teachers (61%) are the only group of respondents that recommends this particular role to any extent. A smaller percentage of administrators (43%) recommends this particular teacher role, and only 6% of the knowledgeables rank this practice first.

Significant differences were found when the percentage of teachers' responses was compared with the percentage of administrators' responses.

Item 3. Administrators (71%) and teachers (75%) recommend that students complete the materials during the class period with a qualified teacher who supplements these materials with other educational learning experiences. Sixty-eight per cent of the knowledgeables rank this practice first, and a total of ninety-six per cent rate this practice first or second. This teacher role is the role recommended by the majority of respondents.

Item 4. Some administrators (21%) and teachers (28%) recommend that students complete these materials out of class, with the regular class period being utilized by the teacher to emphasize other educational learning experiences. Twenty-nine per cent of the knowledgeables rank this practice first.

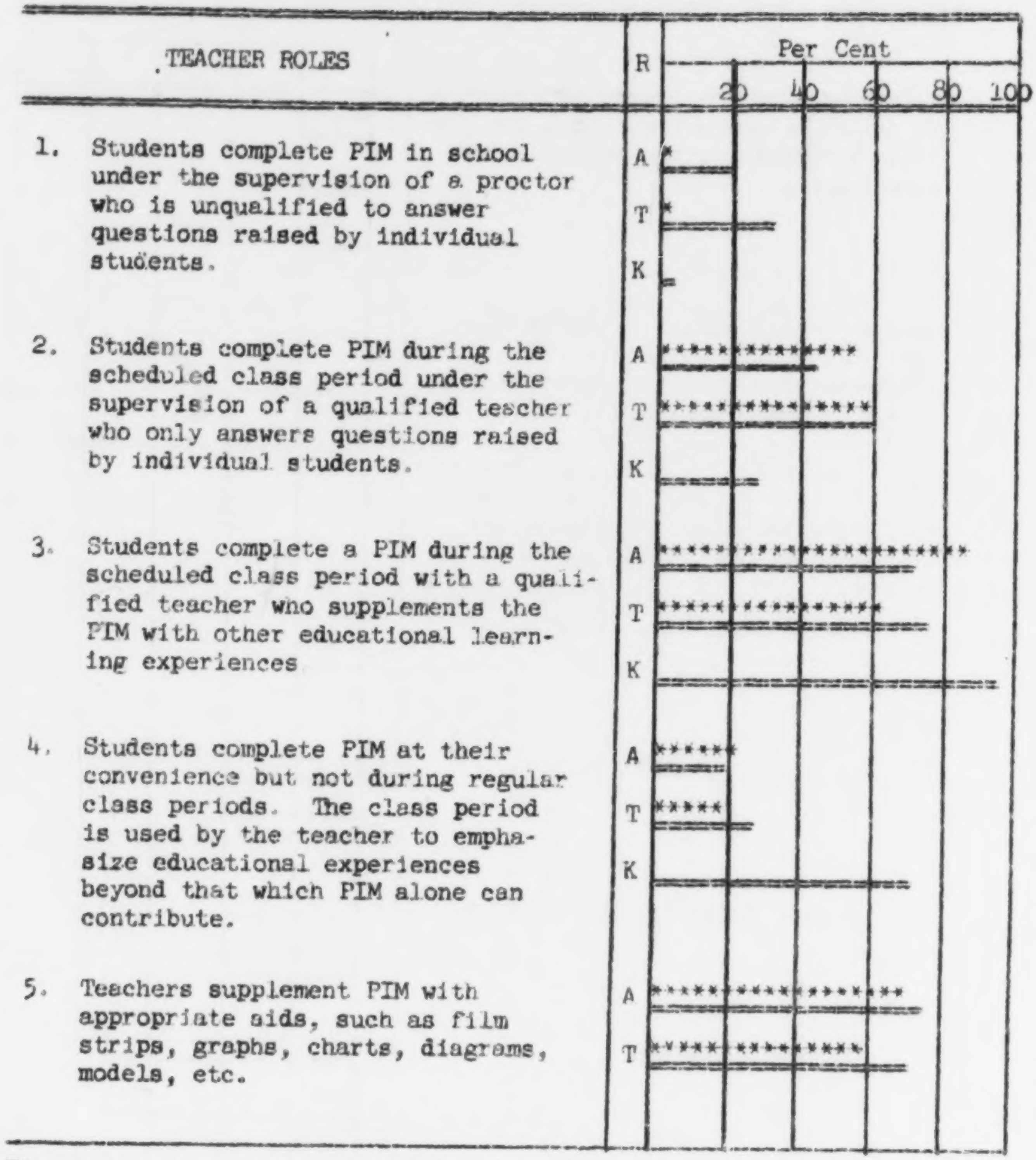
Item 5. Seventy-three per cent of the administrators and sixty-two per cent of the teachers indicate that they supplement the programmed materials with appropriate aids (film strips, graphs, charts, diagrams, models, et cetera). Administrators (75%) and teachers (71%) feel that teachers should supplement the programmed materials with appropriate aids whenever possible.

Item 6. A relatively small percentage of administrators (20%), teachers (21%), and knowledgeables (19%) recommend that teachers use units from a variety of programmed courses covering the same subject.

Item 7. The respondents differ significantly in their assessment of providing teacher aides for teachers using programmed materials. Administrators (31%), teachers (50%), and knowledgeables (87%) recommend that teacher aides assist teachers with clerical duties to provide programmed instruction teachers with more time for creative teaching and planning.

Item 8. Approximately three-fourths of the administrators and teachers recommend that group discussions and demonstrations be utilized by the programmed instruction teacher in addition to the programmed materials.

Other suggested teaching techniques to be used by the programmed instruction teacher in addition to the programmed materials included in the questionnaires are: (1) student committee reports, (2) individual student reports, (3) library reference assignments, and (4) seminars. Less than forty-five per cent of the administrators and teachers agree that programmed instruction teachers should use any of these teaching techniques in addition to the programmed materials.



1. Students complete PIM in school under the supervision of a proctor who is unqualified to answer questions raised by individual students.

2. Students complete PIM during the scheduled class period under the supervision of a qualified teacher who only answers questions raised by individual students.

3. Students complete a PIM during the scheduled class period with a qualified teacher who supplements the PIM with other educational learning experiences

4. Students complete PIM at their convenience but not during regular class periods. The class period is used by the teacher to emphasize educational experiences beyond that which PIM alone can contribute.

5. Teachers supplement PIM with appropriate aids, such as film strips, graphs, charts, diagrams, models, etc.

Figure 5. A comparison between the reported teacher roles and the recommended teacher roles when students are using programmed instructional materials.

Legend:			
**** Existing role		R	Respondents
▬ Recommended role		A	Administrators
PI	Programmed instruction	T	Teachers
PIM	Programmed instructional materials	K	Knowledgeables

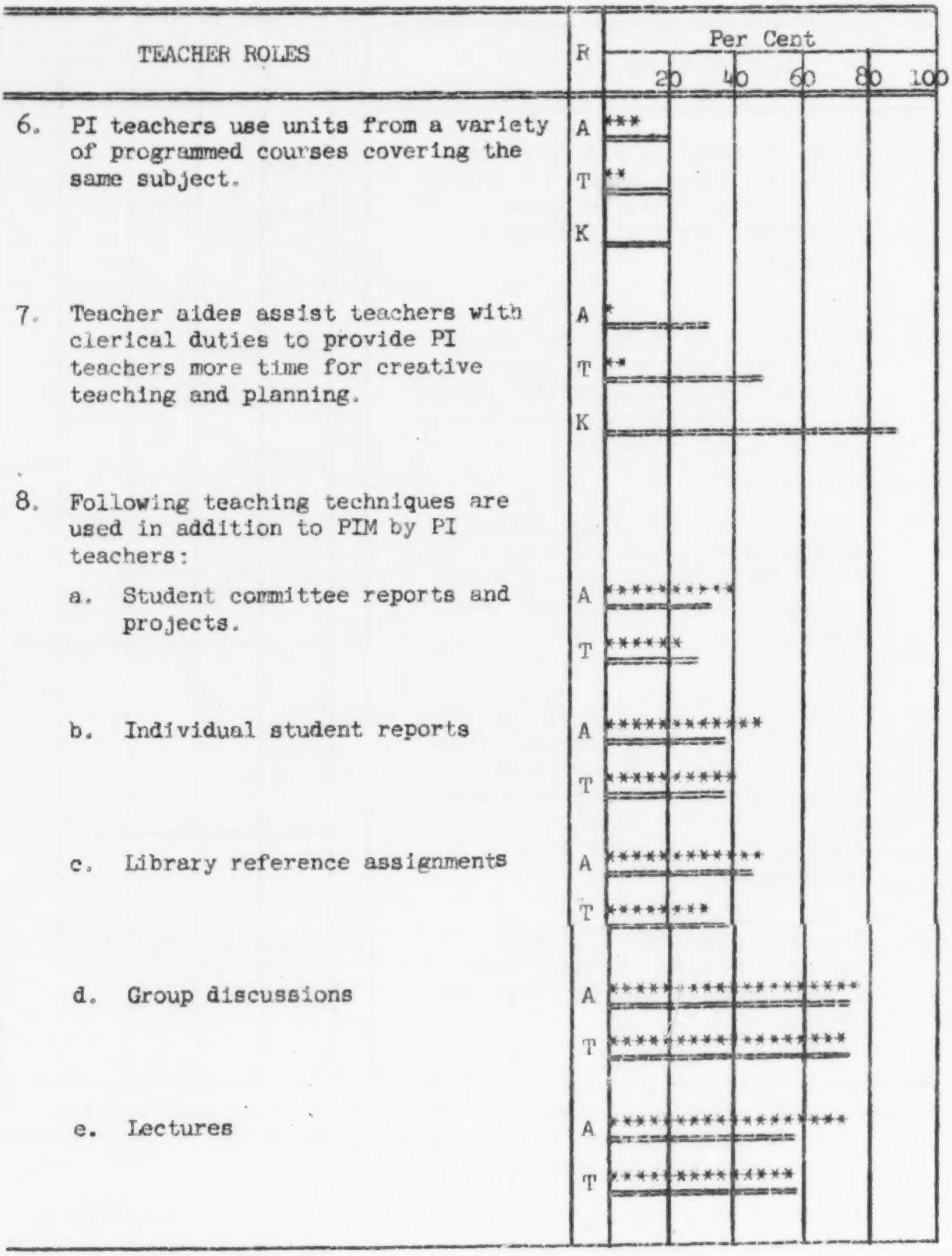


Figure 5. Continued

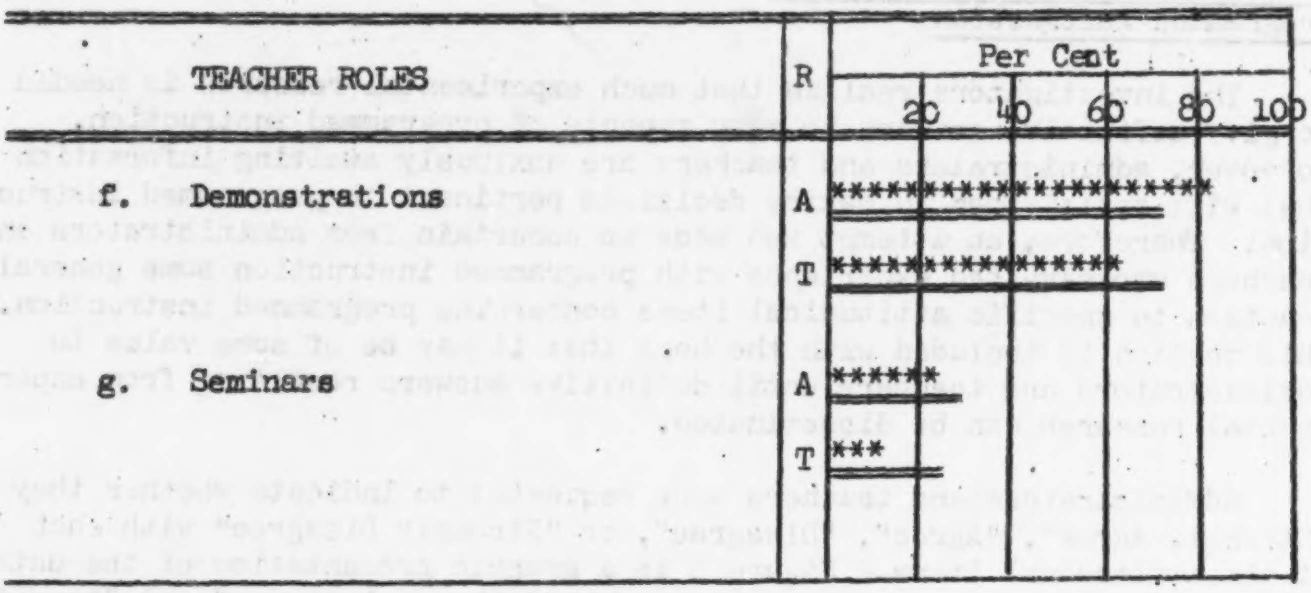


Figure 5. Continued

Responses from administrators and teachers to attitudinal items concerning programmed instruction

The investigators realize that much experimental research is needed to give definitive answers to many aspects of programmed instruction. Moreover, administrators and teachers are anxiously awaiting information that will assist them in making decisions pertinent to programmed instruction. Therefore, an attempt was made to ascertain from administrators and teachers who have had experience with programmed instruction some general reaction to specific attitudinal items concerning programmed instruction. This section is included with the hope that it may be of some value to administrators and teachers until definitive answers resulting from experimental research can be disseminated.

Administrators and teachers were requested to indicate whether they "Strongly Agree", "Agree", "Disagree", or "Strongly Disagree" with each of the attitudinal items. Figure 6 is a graphic presentation of the data; percentages indicated represent the combined "Strongly Agree" and "Agree" responses.

Item 1 indicates that programmed instruction does not require too much of the student's class time in taking tests. Only fifteen per cent of the administrators and teachers indicate that programmed instruction tests require too much of the student's class time.

Item 2. The data suggest that programmed instruction provides efficiency of time in learning subject content. Administrators (77%) and teachers (66%) indicate that programmed instruction provides a saving of class time in the satisfactory completion and mastery of content as compared with the conventional lecture-discussion method.

Item 3. Thirty-seven per cent of the administrators and forty-two per cent of the teachers state that students are more concerned with speed of completion than with mastery of subject content.

Item 4. Administrators (61%) and teachers (50%) indicate that programmed instruction students ask more questions during their discussion sessions than was customary under conventional instruction.

Item 5. Administrators (57%) and teachers (46%) state that programmed instruction limits a student's creativity more than conventional instruction does.

Item 6. A relatively small percentage of administrators (31%) and teachers (38%) agree that because students are using programmed materials, resource books get more attention.

Item 7. Similarly, a relatively small percentage of administrators (22%) and teachers (22%) agree that students in programmed instruction classes select a greater number of individual study projects than those in conventional classes.

Item 8. Administrators (84%) and teachers (72%) indicate that with programmed materials, the student's reading comprehension generally improves more than it does under conventional instruction.

Item 9a. Approximately two-thirds of the administrators (68%) and teachers (66%) indicate that the retention of knowledge through the use of programmed instruction is generally equivalent to that achieved with conventional instruction.

Item 9b. Forty-nine per cent of the administrators and teachers state that the retention of knowledge through the use of programmed instruction is greater than that achieved with conventional instruction.

Item 9c. A relatively small percentage of administrators (9%) and teachers (18%) feel that the retention of knowledge is less than that achieved with conventional instruction.

The data indicate that the retention of knowledge is at least equivalent to that achieved with conventional instruction.

Item 10. Administrators (67%) and teachers (62%) indicate that students achieve more with programmed instruction than with conventional methods.

Item 11. Administrators (63%) and teachers (53%) believe that students like programmed instruction more than conventional instruction.

Item 12. Almost half of the administrators (47%) and more than a third of the teachers (37%) indicate that programmed instruction students demonstrate more interest in continuing or broadening their education in related subjects than students taught by conventional methods.

Item 13a. Programmed instruction appears to do as well as conventional instruction in providing interaction between teacher and students. Administrators (79%) and teachers (68%) indicate that programmed instruction provides as much interaction between teacher and students as conventional instruction.

Item 13b. Less than half of the administrators (47%) and teachers (44%) indicate that programmed instruction does as well as conventional instruction in providing interaction among students.

Item 14. Administrators (55%) and teachers (38%) disagree significantly on whether teachers have generally more time to plan and organize special lectures and/or demonstrations when using programmed instruction than was possible with conventional instruction.

Item 15. Both administrators (91%) and teachers (87%) agree that the teacher can spend more time with individuals or small groups when using these materials than was possible with conventional instruction.

Item 16. A higher percentage of administrators (81%) than teachers (67%) indicate that programmed instruction has made the teacher more effective in his conventional teaching. Significant difference was found when the teachers' responses were compared with the administrators' responses.

Item 17a. The data indicate that the number of disciplinary problems does not increase among students who are using programmed materials. A relatively small percentage of administrators (7%) and teachers (7%) indicate that the number of disciplinary problems is higher than among students taught conventionally.

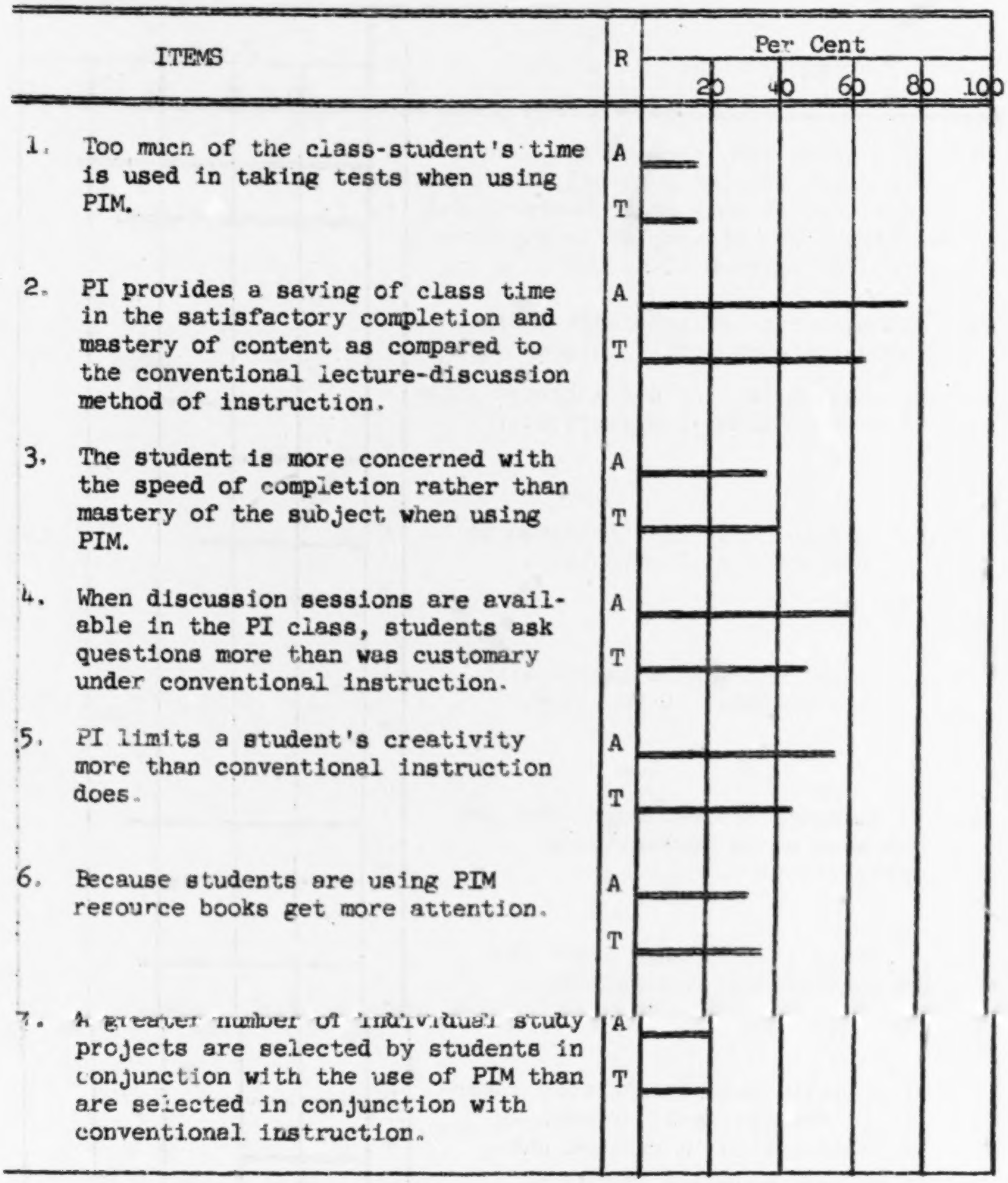
Item 17b. Administrators (56%) and teachers (51%) state that there are fewer disciplinary problems among students using programmed instruction.

Item 17c. Slightly over half of the administrators (53%) and teachers (57%) indicate that there are about the same number of disciplinary problems among programmed instruction students as among students taught conventionally.

Item 18. Twenty per cent of the administrators and sixteen per cent of the teachers indicate that audio-visual aids and devices are used more with programmed instruction than with conventional instruction.

Item 19. Programmed instruction appears to be accepted by the schools that participated in this study. A high percentage of administrators (97%) and teachers (85%) state that they would recommend programmed instruction to other school teachers and administrators.

Graphic presentation of these data is given in Figure 6 on pages 40 through 43.



1. Too much of the class-student's time is used in taking tests when using PIM.

2. PI provides a saving of class time in the satisfactory completion and mastery of content as compared to the conventional lecture-discussion method of instruction.

3. The student is more concerned with the speed of completion rather than mastery of the subject when using PIM.

4. When discussion sessions are available in the PI class, students ask questions more than was customary under conventional instruction.

5. PI limits a student's creativity more than conventional instruction does.

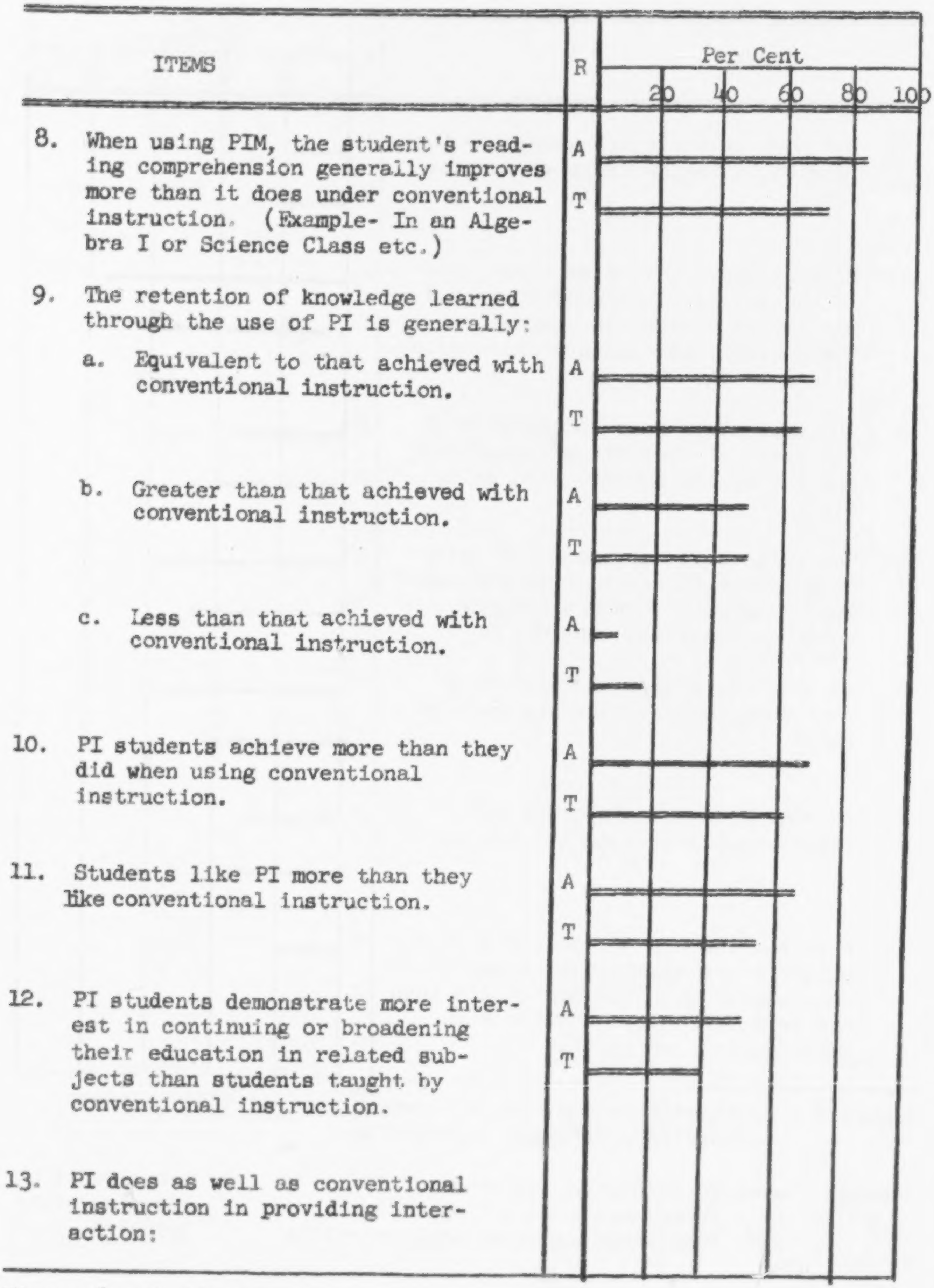
6. Because students are using PIM resource books get more attention.

7. A greater number of individual study projects are selected by students in conjunction with the use of PIM than are selected in conjunction with conventional instruction.

Figure 6. Administrator and teacher response to attitudinal items concerning programmed instruction.

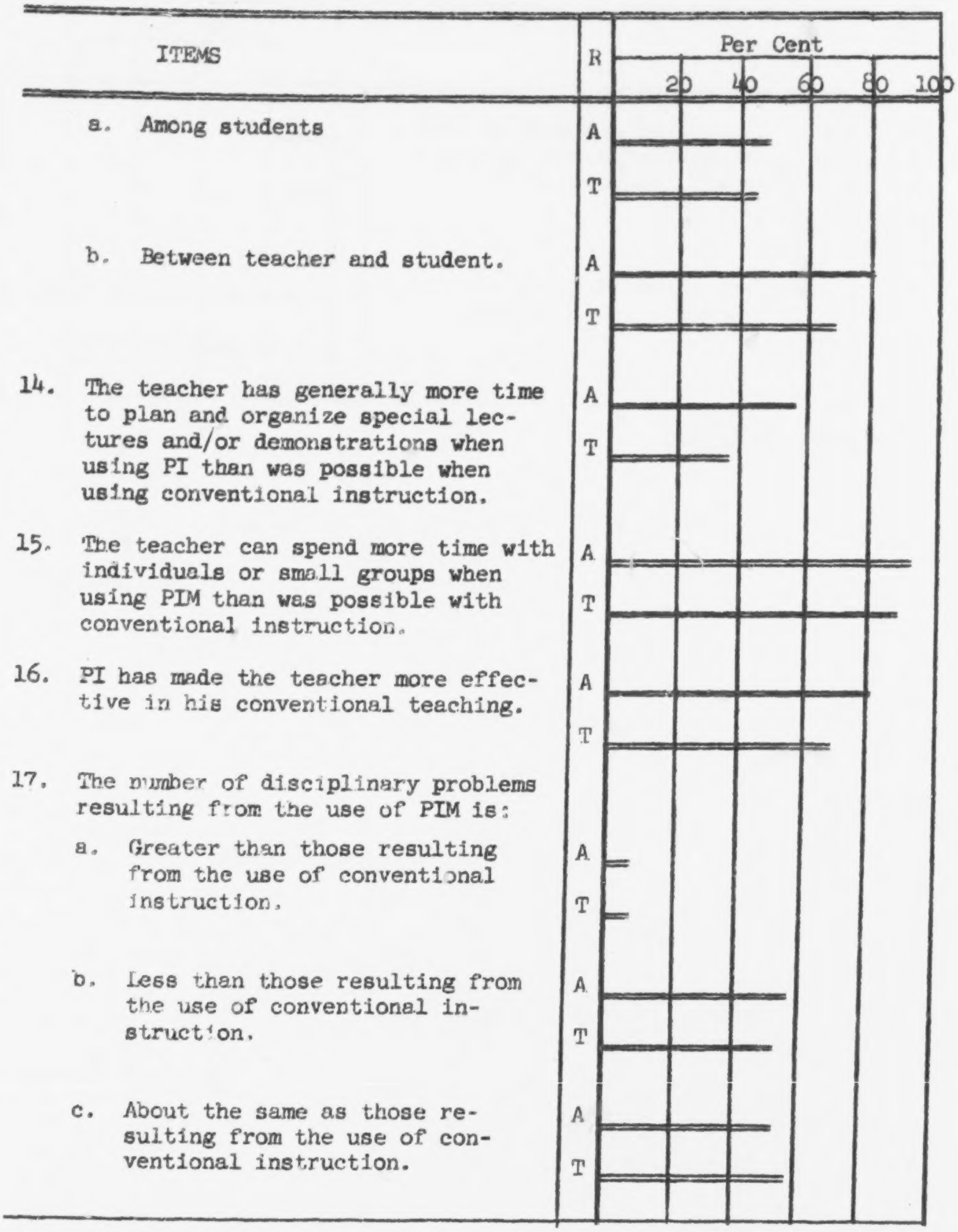
Legend:

▬	Percentage of agreement	R	Respondents
PI	Programmed instruction	A	Administrators
PIM	Programmed instructional materials	T	Teachers



ITEMS	R
8. When using PIM, the student's reading comprehension generally improves more than it does under conventional instruction. (Example- In an Algebra I or Science Class etc.)	A T
9. The retention of knowledge learned through the use of PI is generally:	
a. Equivalent to that achieved with conventional instruction.	A T
b. Greater than that achieved with conventional instruction.	A T
c. Less than that achieved with conventional instruction.	A T
10. PI students achieve more than they did when using conventional instruction.	A T
11. Students like PI more than they like conventional instruction.	A T
12. PI students demonstrate more interest in continuing or broadening their education in related subjects than students taught by conventional instruction.	A T
13. PI does as well as conventional instruction in providing interaction:	

Figure 6. Continued



a. Among students

b. Between teacher and student.

14. The teacher has generally more time to plan and organize special lectures and/or demonstrations when using PI than was possible when using conventional instruction.

15. The teacher can spend more time with individuals or small groups when using PIM than was possible with conventional instruction.

16. PI has made the teacher more effective in his conventional teaching.

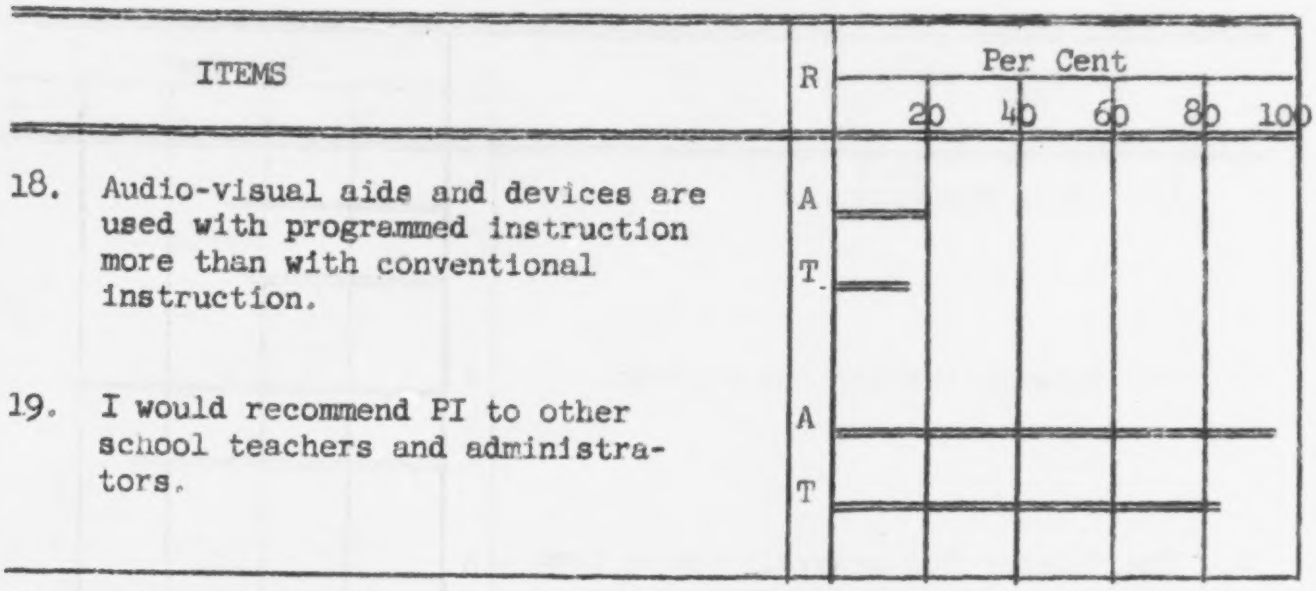
17. The number of disciplinary problems resulting from the use of PIM is:

a. Greater than those resulting from the use of conventional instruction.

b. Less than those resulting from the use of conventional instruction.

c. About the same as those resulting from the use of conventional instruction.

Figure 6. Continued



18. Audio-visual aids and devices are used with programmed instruction more than with conventional instruction.

19. I would recommend PI to other school teachers and administrators.

Figure 6. Continued

The instructional purposes for using programmed instruction

The questionnaire listed six instructional purposes (See Table IV) for using programmed instruction. The teacher selected the purpose(s) most appropriate for his own instructional program. Teachers using these materials for multiple purposes were arbitrarily assigned to that purpose which involved the greatest number of students. This procedure was used to classify the primary purposes of programmed instruction.

Basic course materials rank first of the six instructional purposes of programmed instructional materials. Sixty-three per cent of the teachers (145 out of 230) indicate they use these materials as basic course materials.

TABLE IV
THE PRIMARY INSTRUCTIONAL PURPOSES OF PROGRAMMED MATERIALS AS INDICATED BY 230 TEACHERS

Purposes	Teachers	Per Cent
Basic course materials	145	63
Enrichment materials	53	23
Remedial materials	13	6
Review materials	11	5
Advanced work materials	5	2
Homework materials	3	1

The use of programmed instruction for enrichment purposes ranks second. Twenty-three per cent of the teachers (53 out of 230) use these materials for this instructional purpose.

Eighty-six per cent of the teachers (198 out of 230) use programmed materials primarily for basic course materials or enrichment materials.

Remedial materials rank third (13 out of 230 teachers); review materials rank fourth (11 out of 230 teachers); advanced work materials rank fifth (5 out of 230 teachers); and homework materials rank last (3 out of 230 teachers).

CHAPTER IV

EVALUATION OF SELECTED ADMINISTRATIVE AND INSTRUCTIONAL ADJUSTMENTS

The initiators of the study hypothesized that programmed instruction would provide more desirable educational outcomes if schools made the following administrative and instructional adjustments:

1. Students could progress at different and appropriate rates.
2. Students were evaluated in terms of their individual accomplishments.
3. Teachers were allowed opportunities to contribute to the educational experiences of students beyond those which programmed materials alone would contribute.
4. Students used programmed materials that were most appropriate to the individual student.
5. Teachers were given training and experience with programmed materials prior to, and during, their classroom use of the materials.

Homogeneity of schools on any pertinent variable could neither be assumed nor demonstrated. School districts were represented by several teachers, each with unique or different procedures of program usage. No school, therefore, could be compared with other schools in any way meaningful to this study. Furthermore, the administrators' "score" on the questionnaire was selected to be the contrast unit, rather than the school. This decision is supported by the findings of the questionnaire validation study (p. 9) that the teachers' questionnaire responses were significantly more valid than those of the administrators.

In the development of the teacher and administrator questionnaires (Appendixes F and E), items were specifically constructed to yield data concerning each of the aforementioned hypotheses. The development of the questionnaire has been explained in Chapter II. Table V identifies the items, the number of items, and the maximum possible score on the basis of a "yes" response to each item except items number 3, 4, 30a, 33b, and 33c, to which a "no" response was given positive credit.

The rationale for awarding credit for a "yes" response to a given item for a given hypothesis can be best explained in the following example:

Hypothesis V - Teachers were given training and experience with programmed material prior to, and during, their classroom use of the materials.

Actual Items on Teacher Questionnaire:

12. In-service programs are conducted for staff members prior to their using programmed materials.

13. Programmed instruction consultants are used during these in-service sessions.

17. Programmed materials are used on a small-scale tryout basis prior to the adoption of these materials by the school system.

18. A teacher or administrator has been released full-time or part-time to coordinate and/or to supervise the use of programmed materials.

It was assumed that teachers who responded "yes" to these statements had more pre- and in-service training and opportunities than those teachers who responded "no". The same rationale was used to justify scores on the other hypotheses and the total score.

TABLE V
IDENTIFICATION OF ITEMS ON TEACHER QUESTIONNAIRE FOR EACH HYPOTHESIS

HYPOTHESIS	ITEM NUMBERS	N OF POSSIBLE RESPONSES	MAXIMUM SCORE
I	23, 24, 25, 26, 27 28, 29, 30, 31, 32	22	14
II	33, 34	4	4
III	1, 2, 3, 4, 5 6, 7, 8, 9, 10 11	19	13
IV	19, 20, 21, 22	7	7
V	12, 13, 14, 15, 16 17, 18	7	7
	Total	59	45

Following the scoring of the 230 questionnaires, all teachers were placed on a continuum from "Most Effective" to "Least Effective". The scores ranged from 12 to 39, with the modal score falling in the interval 24-25.

PROCEDURE

In order to compare those teachers whose questionnaire responses categorized them as "Effective" users of programmed instructional materials to those who were classified as "Ineffective" users, the investigators elected to follow five strategies which are briefly described:

Strategy I - An attempt to match "Effective" and "Ineffective" users of PIM on 11 relevant variables. The attitudinal section of the teacher questionnaire was utilized as the discriminating criterion.

Strategy II - Match "Effective" and "Ineffective" users on variables of content area, level of use, and length of program.* Median score was used to separate "Effective" and "Ineffective" users of PIM. Again, the criterion was the attitudinal section of the teacher questionnaire.

Strategy III - The highest and lowest 28 secondary teachers were selected from a secondary school sample of 176 and contrasted on the attitudinal section of the teacher questionnaire. If there was any discrimination between the hypothesized "Effective" and "Ineffective" adjustments, this strategy should have uncovered it.

Strategy IV - A selection of teacher subjects from both extremes of the effective instructional adjustments continuum who were reliably different at the .015 level was made. The subjects were contrasted using the attitudinal responses of the students as the criterion. For this strategy, only secondary teachers who utilized PIM as BIM were included.

Strategy V - A replication of Strategy IV, with the exception that subjects were confined to secondary teachers who employed PIM as SIM.

Strategies VI and VII were employed to contrast the attitudes of students and teachers using PIM at different grade levels (elementary and secondary) and on different modes of utilization (SIM and BIM):

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*Teachers were also matched as to whether programmed instructional material (PIM) was used as the basic instructional material (BIM) or supplementary instructional material (SIM).

Strategy VI - The two methods of using PIM (BIM and SIM) were contrasted using the attitudes of secondary teachers and students as criteria.

Strategy VII - In the aforementioned strategies the major emphasis has been on determining the validity of the hypothesized "effective use score" and in determining attitudinal differences between subjects who were exposed to PIM as BIM or SIM. In all of these instances the elementary student (Grades 1 through 6) has been omitted. In order to gain some insight as to the attitudes of teachers and students in the first six grades toward programmed instruction, their questionnaire responses were contrasted to those of their counterparts in the upper grades.

A more complete description and report of results for the various hypotheses follows:

STRATEGY I - The project staff assembled data pertinent to each school and teacher participating in the project in an attempt to match, on selected characteristics, approximately fifteen teachers from both extremes of the continuum. The following characteristics were used:

Total School Enrollment - Total school enrollments, with appropriate grades, were compiled for each school.

Elementary and Secondary School Enrollment - Elementary school enrollments included grades 1 through 6; secondary school enrollments included grades 7 through 12.

Programmed Materials Used - Each school was identified by the program or programs being used. Materials were classified as programmed instruction if they were listed in Programs '62.[3] Each program was coded twice, once as a specific course (e.g., Algebra I, Algebra II, etc.) and again in the discipline area (e.g., Algebra I and Algebra II were classified as secondary education mathematics).

Basic Instructional Role of the Programmed Materials - Each teacher was requested to indicate the basic instructional role of the programmed material. The following roles were listed on the questionnaire: (1) basic course materials, (2) enrichment materials, (3) homework materials, (4) remedial materials, (5) advanced work materials, and (6) review materials. These six classifications were subsequently dichotimized into the following two categories:

BIM - Basic Instructional Materials. The program was used daily, over an extended period of time (one or two semesters) and by and large used for entire classroom period (e.g., TEMAC, Algebra I).

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[3] The Center for Programed Instruction, Programs '62: A Guide to Programed Instructional Materials Available to Educators by September, 1962. Washington: U.S. Government Printing Office, 1962.

SIM - Supplementary Instructional Materials. The program was used intermittently, over short periods of time (2-3 weeks), to supplement a textbook or selected curricular offerings (e.g., TEMAC, An Introduction to Verbal Problems in Algebra).

Grade Materials Used - Programmed materials used by each school were identified as to grade level.

Number of Students Using Programmed Materials - Schools were identified by the number of students using a specific program.

Wealth of School District - By using records of the Research Bureau of the Pennsylvania Department of Public Instruction, it was possible to obtain the Standard Account Reimbursement Fraction of each school district participating in the project. This factor indicates the wealth of a school district; the higher the fraction of reimbursement, the poorer the school district.

School Experience with Programmed Materials - Data were obtained from each school to determine the number of years' experience they had in using programmed materials.

Teacher Experience with Programmed Materials - Information was obtained from each teacher indicating the years of experience with programmed materials.

Degree Held by Teacher Using Programmed Materials - Teachers were identified according to degree (Bachelor's, Master's,Doctorate).

Major Area of Certification - Teachers were identified according to whether they were using programmed materials in their major areas of certification.

After a series of frustrated attempts, the investigators determined that the "Effective" and "Ineffective" users of PIM could not be successfully matched on the aforementioned variables. This matching problem was ascribed to the high number of matching variables which reduced the number of subjects below acceptable limits.

STRATEGY II - In order to attain a sufficient number, hold content area, level of use, and length of program somewhat constant, the 66 teachers who used TEMAC Algebra I (N=54) and TEMAC Algebra II (N=12) were sorted from the main deck. As an additional control, the instructional use of the program was held constant (BIM). The questionnaire scores for this group ranged from 16 to 36, with a median of 26, Q_1 at 22 and Q_3 at 28. The group was divided at the median. The Chi-square technique was used to contrast the two groups on each item of the attitudinal section of the teachers' questionnaire. Of the 26 contrasts, only Item 10 proved to be significant at the .05 level. The frequencies for each cell for these comparisons are given in Table VI.

Conclusion: These data did not support the hypothesized "Effective" instructional adjustments.

STRATEGY III - Additional attempts to discover any meaningful differences between "Effective" and "Ineffective" adjustments were made. Of the entire sample of 176 secondary teachers in the study, the attitudes of the highest scoring 28 teachers were contrasted to the attitudes of the lowest scoring 28 teachers. The distinction between BIM and SIM was ignored for this analysis. The total score for all hypotheses was used. Maximum score for the lowest group was 21, and minimum score for the highest group was 28.

Each attitudinal item on the second part of the teachers' questionnaire was tested by Chi-square with Yates' correction applied when necessary. Only Items 19 and 20 of the 26 contrasts proved to be significant at the .05 level. After inspection of Table VI, the reader will note the general favorable disposition of the teachers toward programmed instruction and its classroom effects.

Conclusion: These data did not support the hypothesized "Effective" instructional adjustments.

It was not the purpose of the contrasts in Strategies II and III to determine the significance of the teachers' attitude toward programmed instruction; however, the reader can quickly see some meaningful trends in favor of programmed instruction when the frequencies of the High and Low groups are combined.

STRATEGY IV - Having encountered little prior success in finding meaningful differences between hypothesized effective and ineffective adjustments in the use of PIM using teacher attitudinal responses as the criterion, the investigators elected to utilize attitudinal responses of secondary students as the criterion. Again, to hold the instructional use of the materials constant, only those students who employed PIM in a basic instructional (BIM) manner were incorporated into the following strategy. These students represented teachers who were at the extremes of the effective instructional adjustment continuum.

"Effective" (High-scoring) Group - Teachers were judged to be making effective use of the materials if they had a minimum score of 27 points on the questionnaire. This composite minimum should identify those teachers who were distinctly different from a group of low-scoring teachers. Nine teachers representing 490 students satisfied this criterion.

"Ineffective" (Low-scoring) Group - Teachers were judged to be making ineffective use of the materials if they had a maximum questionnaire score of 21. Eight teachers representing 455 students came under this category.

TABLE VI

CONTRASTS OF HIGH-SCORING TEACHER GROUPS WITH LOW-SCORING TEACHER GROUPS STRATEGY II AND STRATEGY III

		STRATEGY II			STRATEGY III		
	SCORE CATEGORY	N	% AGREE	% DIS-AGREE	N	% AGREE	% DIS-AGREE
1. Too much of the class-student time is used in taking tests when using programmed instructional materials.	High	33	21	79	28	29	71
	Low	33	6	94	27	11	89
	Combined	66	14	86	55	20	80
2. The teacher can spend more time with individuals or small groups when using programmed materials than was possible with conventional instruction.	High	33	91	9	28	89	11
	Low	33	82	18	27	85	15
	Combined	66	86	14	55	87	13
3. Audio-visual aids and devices are used with programmed instruction more than with conventional instruction.	High	33	12	88	26	23	77
	Low	33	6	94	26	19	81
	Combined	66	9	91	52	21	79
4. The teacher has generally more time to plan and organize special lectures and/or demonstrations when using programmed instruction than was possible when using conventional instruction.	High	33	18	82	28	39	61
	Low	33	12	88	27	48	52
	Combined	66	15	85	55	44	56
5. When using programmed materials, the student's reading comprehension generally improves more than it does under conventional instruction. (Example, in an Algebra I or Science class, etc.)	High	32	69	31	27	70	30
	Low	32	72	28	26	58	42
	Combined	64	70	30	53	64	36
6. Because students are using programmed materials, resource books get more attention.	High	32	31	69	27	37	63
	Low	33	24	76	26	38	62
	Combined	65	28	72	53	38	62

TABLE VI
(Continued)

ITEM	SCORE CATEGORY	STRATEGY II N	STRATEGY II % AGREE	STRATEGY II % DIS-AGREE	STRATEGY III N	STRATEGY III % AGREE	STRATEGY III % DIS-AGREE
7. When discussion sessions are available in the programmed instruction class, students ask questions more than was customary under conventional instruction.	High	31	48	52	28	57	43
	Low	31	42	58	26	46	54
	Combined	62	45	55	54	52	48
8. The retention of knowledge learned through the use of programmed instruction is generally:							
a. equivalent to that achieved with conventional instruction.	High	30	67	33	24	75	25
	Low	29	62	38	23	78	22
	Combined	59	64	36	47	77	23
b. greater than that achieved with conventional instruction.	High	29	31	69	25	48	52
	Low	26	46	54	22	45	55
	Combined	55	38	62	47	47	53
c. less than that achieved with conventional instruction.	High	29	34	66	23	17	83
	Low	26	27	73	23	17	83
	Combined	55	31	69	46	17	83
9. Programmed instruction students achieve more than they did when using conventional instruction.	High	31	48	52	26	58	42
	Low	31	58	42	27	63	37
	Combined	62	53	47	53	60	40
10. Programmed instruction limits a student's creativity more than conventional instruction does.	High	32	62	38	26	50	50
	Low	32	38	62	25	52	48
	Combined	64	50	50	51	51	49

TABLE VI
(Continued)

ITEM		STRATEGY II			STRATEGY III		
		N	% AGREE	% DIS-AGREE	N	% AGREE	% DIS-AGREE
11. A greater number of individual study projects are selected by students in conjunction with the use of programmed materials than are selected in conjunction with conventional instruction.	High	30	20	80	24	17	83
	Low	33	6	94	23	30	70
	Combined	63	13	87	47	23	77
12. Programmed instruction does as well as conventional instruction in providing interaction:							
a. among students.	High	31	58	42	28	50	50
	Low	33	58	42	24	42	58
	Combined	64	58	42	52	46	54
b. between teacher and student.	High	32	69	31	26	81	19
	Low	33	64	36	27	67	33
	Combined	65	66	34	53	74	26
13. The student is more concerned with the speed of completion rather than mastery of the subject when using programmed materials.	High	33	55	45	28	36	64
	Low	32	44	56	25	48	52
	Combined	65	49	51	53	42	58
14. Programmed instruction provides a saving of class time in the satisfactory completion and mastery of content as compared with the conventional lecture-discussion method of instruction.	High	33	61	39	28	64	36
	Low	30	57	43	27	63	37
	Combined	63	59	41	55	64	36
15. Programmed instruction students demonstrate more interest in continuing or broadening their education in related subjects than students taught by conventional instruction.	High	29	34	66	26	38	62
	Low	29	28	72	25	24	76
	Combined	58	31	69	51	31	69

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TABLE VI
(Continued)

ITEM	SCORE CATEGORY	STRATEGY II N	 % AGREE	 % DIS-AGREE	STRATEGY III N	 % AGREE	 % DIS-AGREE
16. The number of disciplinary problems resulting from the use of programmed materials is:							
a. greater than those resulting from the use of conventional instruction.	High	30	10	90	27	11	89
	Low	27	7	93	21	0	100
	Combined	57	9	91	48	6	94
b. less than those resulting from the use of conventional instruction	High	30	40	60	26	38	62
	Low	28	61	39	23	43	57
	Combined	58	50	50	49	41	59
c. about the same as those resulting from the use of conventional instruction.	High	31	61	39	28	61	39
	Low	30	47	53	20	75	25
	Combined	61	54	46	48	67	33
17. Programmed instruction has made the teacher more effective in his conventional teaching.	High	32	63	37	28	57	43
	Low	32	47	53	26	58	42
	Combined	64	55	45	54	57	43
18. Students like programmed instruction more than they like conventional instruction.	High	32	47	53	26	62	38
	Low	30	27	73	25	52	48
	Combined	62	37	63	51	57	43

TABLE VI
(Concluded)

ITEM	SCORE CATEGORY	STRATEGY II N	 % AGREE	 % DIS-AGREE	STRATEGY III N	 % AGREE	 % DIS-AGREE
19. Clerical duties are more demanding when using programmed materials than when using conventional instruction.	High	33	94	6	28	86	14
	Low	32	94	6	27	52	48
	Combined	65	94	6	55	69	31
20. The additional adjustments, resulting from the use of programmed materials, have been frustrating.	High	31	45	55	28	29	71
	Low	33	42	58	26	8	92
	Combined	64	44	56	54	19	81
21. I would recommend programmed instruction to other school teachers and administrators.	High	31	84	16	25	80	20
	Low	31	68	32	26	85	15
	Combined	62	76	24	51	82	18

Significance of Difference between "Effective" (High) and "Ineffective" (Low) Groups - After an interval of four months, a random sample of 51 teachers who had responded to the teacher's questionnaire in January were requested to respond to the same questionnaire a second time. It was urged that they make their second responses independent of their first. Forty-nine questionnaires were returned; forty-six were usable. The test-retest correlation for these 46 teachers was found to be .54. This correlation is significantly different from zero well beyond the .001 level. The means for the first and second administrations were 22.15 and 24.37, respectively. Standard deviations were 3.96 and 4.23, respectively.

For an individual teacher who scored 21 or less on the first administration ("Ineffective" - Low Group) to score a minimum of 27 ("Effective" - High Group) on the second administration is highly improbable. The standard error of measurement based on test-retest reliability of .54 and a standard deviation of 3.96 is 3.24 score units. The chance of a score at 21 (maximum allowed for teachers in the "Ineffective" group) to be at 27 (minimum allowed for "Effective" group) is less than .015; this same probability holds for the reverse case of a 27 score being at 21. These data satisfied the investigators that for whatever the questionnaire measured, at least these two groups of teachers were reliably and significantly different.

Student Response - Having identified those teachers who were at extreme positions in terms of effective utilization of PIM, student samples representing each teacher were asked to respond to a Student Attitudinal Questionnaire (Appendix L). If there were any meaningful differences between the hypothesized "Effective" and "Ineffective" uses of programmed material, the students' attitudes should reflect these differences. Table VII gives the results and interpretation for each item on the student questionnaire.

The four response categories of "Strongly Agree", "Agree", "Strongly Disagree" and "Disagree" were collapsed into "Agree" and "Disagree." Number and percentages are reported in Table VII for only the combined "Strongly Agree" and "Agree" category; "Disagree" percentages, in all cases, are 100 minus the percentage of "Agree."

Conclusion: The reader is referred to Table VII for the presentation of the student attitudinal data from this strategy. One would expect, if the hypothesized instructional adjustments were effective, that there would be significant favorable trends for those students who represented "Effective" teachers, as defined above. Although there were twelve significant differences, there was no differentiation between practitioners of the so-called "Effective" and "Ineffective" adjustments. In fact, in seven of the twelve differences, it was found that the students of the "Ineffective" teacher group were significantly more favorable toward PIM than their counterparts in the "Effective" teacher group. Again, the conclusion is drawn that there is no empirical support for the hypothesized instructional adjustments.

STRATEGY V - In the previous strategy, the investigation was confined to those teachers who utilized PIM as a basic instructional material. In an attempt to determine if the hypothesized effective instructional adjustments were tenable for instructional purposes (other than BIM), Strategy IV was replicated for teachers who employed PIM in a supplementary manner.

Ten teachers who scored at or above an arbitrary criterion questionnaire score of 25 administered the attitudinal questionnaire to their students. Five teachers who scored at or below 18 followed the same procedure with their students. The reliability of the difference between these two extreme teacher groups is the same as given for the two teacher groups defined in Strategy IV. The student attitudinal questionnaire was the criterion variable.

Conclusion: The reader is referred to Table VII for the presentation of these data. Twelve of the nineteen contrasts were significantly different, all twelve in favor of the high-scoring teacher group. Students of these teachers evidenced a significantly more favorable attitude than that of their counterparts in the low-scoring teacher group.

Strategy V lends support to the hypothesized effective instructional adjustments. Apparently students are capable of discriminating between "Effective" and "Ineffective" teacher instructional adjustments when PIM is used in a supplementary manner.

The fact that students could discriminate between those teachers who did and those who did not employ effective instructional adjustments in a SIM environment tends to support the validity of that distinction, even though students in BIM settings could not so discriminate.

These findings led the investigators to the tentative conclusion that the utilization of PIM created more favorable student attitudes in a SIM, rather than in a BIM setting.

Therefore, the available data were used in Strategy VI to test the following two hypotheses:

HYPOTHESIS A: Students are more favorably disposed toward PIM when it is employed in a supplementary manner.

HYPOTHESIS B: Teachers are more favorably disposed toward PIM when it is employed in a supplementary manner.

STRATEGY VI: Hypothesis A - The attitudinal questionnaire responses of secondary students who were exposed to programmed instruction as BIM and those who used it as SIM were contrasted (Table VII). The Chi-square technique indicates that nine of the nineteen questionnaire items discriminated between the two groups. Seven of the nine discriminations indicate that students exposed to PIM as SIM are significantly more favorable in their attitudes toward PIM than are their counterparts who used it as BIM. The BIM students are considerably less favorably disposed

TABLE VII

PERCENTAGE OF STUDENT AGREEMENT BY STRATEGY FOR ATTITUDINAL ITEMS

ITEM	STRATEGY IV		STRATEGY V		STRATEGY VI		STRATEGY VII	
	BIM High (N=490)	BIM Low (N=455)	SIM High (N=300)	SIM Low (N=228)	BIM Total (N=945)	SIM Total (N=528)	SIM Elem. (N=157)	SIM Sec. (N=528)
1. Programmed instruction has caused me to ask more questions than was customary under conventional instruction.	40*	30	38*	33	35	36	39	36
2. I feel that programmed instruction has made the teacher more effective.	39	49*	54*	47	44	51*	74*	51
3. I like programmed instruction more than I do conventional instruction.	54	57	70*	58	55	65*	90*	65
4. Programmed instructional materials are more helpful to me than conventional textbooks.	59	61	65*	51	60	60	76*	60
5. When using programmed instruction, I use more reference books than I normally do in my other classes.	12	16	10	11	13	10	18*	10
6. Programmed instruction has caused me to do more individual study projects than I would normally have done.	28	24	34*	16	26	26	72*	26

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* Asterisk denotes significant difference at .05 level.

TABLE VII - (Continued)

PERCENTAGE OF STUDENT AGREEMENT BY STRATEGY
FOR ATTITUDINAL ITEMS

ITEM	STRATEGY IV BIM High (N=490)	STRATEGY IV BIM Low (N=455)	STRATEGY V SIM High (N=300)	STRATEGY V SIM Low (N=228)	STRATEGY VI BIM Total (N=945)	STRATEGY VI SIM Total (N=528)	STRATEGY VII SIM Elem. (N=157)	STRATEGY VII SIM Sec. (N=528)
7. I am able to do more assignments by myself because of my experience with programmed instruction.	68*	57	66*	56	63	62	94*	61
8. I would like to use programmed instructional materials in my other classes.	38	52*	66*	51	45	60*	92*	60
9. I like courses that use programmed instruction.	53	60*	71*	49	56	62*	95*	65
10. I would use programmed instruction if I were teaching.	47	54*	71*	54	51	64*	93*	64
11. I hope that I have at least one course next year that uses programmed instruction.	53	62*	70	65	57	68*	99*	68
12. I am going to recommend programmed instruction to my friends.	51	49	65*	38	50	53	89*	53
13. Programmed instruction should be used in my other courses.	31	48*	60*	43	38	52*	80*	52

TABLE VII -(Concluded)

PERCENTAGE OF STUDENT AGREEMENT BY STRATEGY FOR ATTITUDINAL ITEMS

ITEM	STRATEGY IV BIM High (N=490)	STRATEGY IV BIM Low (N=455)	STRATEGY V SIM High (N=300)	STRATEGY V SIM Low (N=228)	STRATEGY VI BIM Total (N=945)	STRATEGY VI SIM Total (N=528)	STRATEGY VII SIM Elem. (N=157)	STRATEGY VII SIM Sec. (N=528)
14. Programmed instruction allows the teacher to spend more time with individuals or small groups of students than is done in conventional classes.	88*	78	83*	67	84*	76	85*	76
15. Programmed instruction has helped me to read better.	65*	50	58*	36	58*	49	82*	49
16. I find that programmed instruction is a boring method of learning.	46	45	34	51*	45	41	3	41*
17. Even though programmed instruction permits the student to learn by himself, I feel that a teacher must be available for:								
a. individual help	99	94	96	95	96	96	92	96
b. periodic lectures and demonstrations	85*	78	83	78	82	81	83	84
c. discussion sessions	86	90	89	87	88	88	91	88

TABLE VIII

PERCENTAGE OF TEACHER AGREEMENT BY STRATEGY FOR ATTITUDINAL ITEMS

ITEM	STRATEGY VI: HYPOTHESIS B		STRATEGY VII	
	BIM Secondary (N=129)	SIM Secondary (N= 47)	SIM Elementary (N= 55)	SIM Secondary (N= 47)
1. Too much of the class-student time is used in taking tests when using programmed instructional materials.	19	11	5	11
2. The teacher can spend more time with individuals or small groups when using programmed materials than was possible with conventional instruction.	87	96	75	96*
3. Audio-visual aids and devices are used with programmed instruction more than with conventional instruction.	14	22	16	22
4. The teacher has generally more time to plan and organize special lectures and/or demonstrations when using programmed instruction than was possible when using conventional instruction.	26	65*	42	65*
5. When using programmed instructional materials, the student's reading comprehension generally improves more than it does under conventional instruction (e.g., in an Algebra I or Science class, etc.).	76	75	62	75

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* Asterisk denotes significant difference at .05 level.

TABLE VIII - (Continued)

PERCENTAGE OF TEACHER AGREEMENT BY STRATEGY FOR ATTITUDINAL ITEMS

ITEM	STRATEGY VI: HYPOTHESIS B		STRATEGY VII	
	BIM Secondary (N=129)	SIM Secondary (N= 47)	SIM Elementary (N= 55)	SIM Secondary (N= 47)
6. Because students are using programmed instructional materials, resource books get more attention.	35	40	44	40
7. When discussion sessions are available in the programmed instruction class, students ask questions more than was customary under conventional instruction.	52	64	46	64
8. The retention of knowledge learned through the use of programmed instruction is generally:				
a. equivalent to that of conventional instruction.	61	82*	66	82
b. greater than that of conventional instruction.	44	61	51	61
c. less than that of conventional instruction.	27	17	19	17
9. Programmed instruction students achieve more than they did when using conventional instruction.	61	68	59	67
10. Programmed instruction limits a student's creativity more than conventional instruction does.	45	43	32	43

TABLE VIII - (Continued)

PERCENTAGE OF TEACHER AGREEMENT BY STRATEGY FOR ATTITUDINAL ITEMS

	STRATEGY VI: HYPOTHESIS B		STRATEGY VII	
ITEM	BIM Secondary (N=129)	SIM Secondary (N= 47)	SIM Elementary (N= 55)	SIM Secondary (N= 47)
11. A greater number of individual study projects are selected by students in conjunction with the use of programmed materials than are selected in conjunction with conventional instruction.	16	20	37	20
12. Programmed instruction does as well as conventional instruction in providing interaction:				
a. among students.	46	44	40	44
b. between teacher and student.	68	72	67	72
13. The student is more concerned with the speed of completion rather than mastery of the subject when using programmed materials.	38	52	40	52
14. Programmed instruction provides a saving of class time in the satisfactory completion and mastery of content as compared with the conventional lecture-discussion method of instruction.	65	76	60	76
15. Programmed instruction students demonstrate more interest in continuing or broadening their education in related subjects than students taught by conventional instruction.	34	30	49	30

TABLE VIII - (Concluded)

PERCENTAGE OF TEACHER AGREEMENT BY STRATEGY FOR ATTITUDINAL ITEMS

ITEM	STRATEGY VI: HYPOTHESIS E BIM Secondary (N=129)	 SIM Secondary (N= 47)	STRATEGY VII SIM Elementary (N= 55)	 SIM Secondary (N= 47)
16. The number of disciplinary problems resulting from the use of programmed instructional materials is:				
a. greater than that resulting from the use of conventional instruction.	9	3	7	3
b. less than that resulting from the use of conventional instruction.	48	54	59	54
c. about the same as that resulting from the use of conventional instruction.	53	58	65	58
17. Programmed instruction has made the teacher more effective in his conventional teaching.	63	71	71	71
18. Students like programmed instruction more than they like conventional instruction.	48	59	63	59
19. Clerical duties are more demanding when using programmed materials than when using conventional instruction.	84*	47	62	47
20. The additional adjustments resulting from the use of programmed materials have been frustrating.	37*	4	21*	5
21. I would recommend programmed instruction to other school teachers and administrators.	79	93*	85	93

toward PIM, with the exception of their significantly stronger feeling that PIM allows the teacher to spend more time with individuals or small groups of students than is done in conventional classes (Item 14), and has helped the student to improve his reading (Item 15).

General Implications of Student Responses - Differences apparently occur between the attitudes of students exposed to PIM as BIM and those who used it as SIM; the latter are usually more favorably disposed toward PIM. In fact, the only questionnaire items that indicated a more favorable attitude toward PIM on the part of the BIM students could well be expected in the light of increased teacher time for individual attention and the considerably increased student reading necessitated by the BIM approach.

STRATEGY VI: Hypothesis b - In an effort to determine if there were any differences between the attitudes of those secondary level teachers who used programmed instruction as BIM (N=129) and those who used it as SIM (N=47), the attitudinal questionnaires of these two teacher groups were contrasted. The Chi-square technique indicates that only five of the twenty-seven items discriminate between the two groups. However, when one examines the items (Table VIII), it becomes apparent that those teachers who used PIM as BIM believe they have less time to plan (Item 4), are less convinced that retention with PIM is equal to that of conventional instruction (Item 8a), consider clerical duties more demanding (Item 19), and feel more frustrated than those teachers who used the material as SIM (Item 20). Probably the most telling difference between the two groups occurs on Item 21, which shows BIM teachers significantly more reluctant to recommend PIM to other teachers and administrators. It is interesting to note that although there were only five statistically significant attitudinal differences between the two teacher groups, SIM teachers were more favorably disposed toward PIM on twenty-three of the twenty-six questionnaire comparisons.

General Implications of Teacher Responses - It would appear that when there were differences between the attitudes of teachers who employed programmed instruction as BIM and those who used it as SIM, the BIMs were significantly less favorably disposed; the teacher responses indicate that teachers are more comfortable utilizing PIM in a supplementary manner.

It should be remembered that the subjects were all secondary teachers and there was no classification as to "Effective" or "Ineffective" instructional adjustments. The only variable examined was the attitude of teachers who employed PIM as either a basic instructional material (BIM) or as a supplementary instructional material (SIM).

STRATEGY VII - In order to gain some insight into the attitudes of teachers (N=55) and students (N=157) in the first six grades toward PIM, their questionnaire responses were compared with those of their counterparts in the upper grades. Since the elementary teachers and students were only exposed to PIM used as SIM, it was necessary to limit the secondary sample to subjects of similar experience. Therefore, all secondary teachers and students who were using PIM as BIM were excluded. The Chi-square technique was used to test the differences between the groups on the attitudinal sections of the questionnaire.

Comparison of Student Questionnaires - Table VII indicates that both elementary and secondary students are generally favorably disposed toward PIM. When the Chi-square technique was employed, it showed the elementary students to be significantly more favorable toward PIM on fifteen of the nineteen questionnaire items. The elementary students in the study are very favorably disposed toward PIM.

Comparison of Teacher Questionnaires - When the attitudes of elementary and secondary teachers are compared, only three of the twenty-five questionnaire items discriminate between the two groups. Table VIII indicates that the elementary teachers are significantly less favorable toward PIM on the three items which differentiate them from secondary teachers. The questionnaire responses of the elementary teachers are at considerable variance with those of their students, who were overwhelmingly in favor of PIM.

Conclusion: Both elementary and secondary students are in favor of PIM, with the elementary students being significantly more favorable. There is only a slight difference in the attitudes of the elementary and secondary teachers, with the elementary teachers tending to be less favorably disposed toward PIM. The reason for the more favorable position of the elementary students toward PIM is open to some conjecture. These youngsters have little prior conventional instruction to use as a basis for comparison and may be unable to differentiate between teacher rating and PIM rating; or it may well be that the elementary student is not so disposed as is his secondary counterpart to make critical evaluations of his educational environment. Whatever the reason, the positive assessment of PIM by elementary students does not appear to be due to the enthusiasm of their teachers for this medium of instruction.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The reader is reminded that this study was divided into two phases, each with a distinct purpose.

Phase I - Identification of administrative and instructional practices and adjustments involved in the use of programmed instruction in schools of Pennsylvania.

Phase II - Evaluation of certain hypothesized modes of effective instructional practice in the classroom use of programmed materials.

Conclusions - Phase I

The following conclusions are based on the responses of administrators, teachers, and "knowledgeable" persons:

1. A relatively high percentage of administrators (97%) and teachers (85%) are recommending programmed instruction.

2. Approximately two-thirds of the teachers have been using programmed instruction for regular instruction, and one-fourth of the teachers have been using programmed instruction for enrichment.

3. Schools are not providing nor are they recommending a specific resource room with programmed instruction media for remedial and supplementary self-instruction.

4. Generally in utilizing programmed instructional materials, schools are introducing some method of pacing students through these materials rather than permitting complete self-pacing by students.

5. Generally, assessment procedures are not being used by teachers to determine students' weaknesses and readiness to learn the programmed content before they commence with the programmed materials.

6. Special reporting procedures are not being used to report student progress to parents.

7. In-service programs prior to the introduction of programmed instruction are essential for the success of programmed instruction.

8. Teachers should work through a program prior to having students work with the programmed material.

9. Programmed instruction has not basically changed the role of the teacher. The teacher continues to have an active role in the use of programmed instructional materials.

10. The objectives of instruction are not changed because of programmed instruction; therefore, the usual evaluation methods can be used.

11. Programmed materials are used on a small-scale tryout basis prior to the schools' adoption of these materials.

12. Only teachers sympathetic to programmed materials are assigned to use these materials.

13. Student sharing of programmed instructional materials impedes the effectiveness of programmed instruction.

14. The following conclusions are based on the responses of administrators and teachers to specific attitudinal questionnaire items. Administrators and teachers appear to believe that:

a. Programmed instruction provides a saving of class time in the satisfactory completion and mastery of content compared to the conventional lecture-discussion method of instruction.

b. Students do not select a greater number of individual study projects in conjunction with programmed instruction as compared with conventional instruction.

c. Students' reading comprehension generally improves more with programmed instruction than it does with conventional instruction.

d. The retention of knowledge through programmed instruction is equal to or greater than the retention through conventional instruction.

e. Programmed instruction students generally achieve more than they did when they were being taught by conventional instruction.

f. Programmed instruction does as well as conventional instruction in providing interaction between teacher and students but not so well in providing interaction among students.

g. The teacher can spend more time with individuals or small groups when using programmed instruction than was possible with conventional instruction.

h. Programmed instruction has made the teacher more effective in his conventional teaching.

i. Audio-visual aids and devices are not being used any more with programmed instruction than they were with conventional instruction.

Recommendations - Phase I

The data indicate that there are some common agreements among the responding teachers, administrators, and knowledgeable persons concerning the effective implementation and use of programmed materials. Specifically, the following recommendations are viewed by the investigators as representing the majority view and judgments of the teachers, administrators, and knowledgeable persons:

1. In-service programs should be conducted for staff members prior to their use of programmed instructional materials.

2. There should be periodic evaluation and planning sessions between teachers and administrators throughout the school year, especially during the first year of using programmed materials.

3. Consultants in the use of programmed instructional materials should be used during these in-service programs.

4. Only teachers sympathetic to the use of programmed instructional materials should be selected to use these materials.

5. Only teachers having a thorough knowledge of the subject content should be allowed to use programmed instructional materials in the classroom covering that particular subject.

6. Subject-teacher curriculum committees should select the programmed instructional materials.

7. Programmed materials selected should be based on the educational objectives established by the school for that particular course.

8. Programmed instructional materials should be used on a small-scale tryout basis prior to the adoption of these materials by the school system.

9. Assessment procedures should be used to enable the teacher:

    a. To determine the individual student's readiness for the programmed course; and

    b. To diagnose weaknesses that must be attended to before the student may be able to use the programmed instructional materials.

10. Each student within a programmed instruction class should be permitted to progress at a rate appropriate to his ability, but minimum pace requirements must be established for the individual.

11. Students should be required to attain a minimum acceptable score on the unit tests before they are permitted to move on to the next unit in the programmed course.

12. Students should be given individual or small-group assistance by the programmed instruction teacher in areas where the results of a unit test indicate low or average achievement.

13. When each programmed instruction student is ready to proceed to the next higher unit, the materials should always be available.

14. When a student has satisfactorily learned the content of the program, he should be able to advance to the next course sequence regardless of the time of the academic year.

15. Course or subject credit should be given to students upon the satisfactory completion (degree or mastery) of a programmed course regardless of the time expended.

16. Students should be permitted to complete programmed instructional materials during the scheduled class period, with the teacher supplementing the materials by teacher-led discussions and related educational learning experiences. However, this does not preclude students' using materials at home as well as in school.

17. Teachers should supplement the programmed materials with appropriate aids such as film strips, graphs, charts, diagrams, models, and so forth.

18. Teachers should have group discussions and demonstrations whenever it is possible to provide additional educational learning experiences beyond those which programmed instructional materials alone can contribute.

Conclusions - Phase II

The conclusions of the preceding phase found considerable agreement among teachers, administrators, and "knowledgeable" persons concerning recommended instructional adjustments. The five hypothesized adjustments investigated in the second phase received strong endorsement by all respondents. The following conclusions are relevant to the hypothesized effective adjustments.

1. In a BIM environment, there was no empirical support for the hypothesized "Effective" instructional adjustments. For reasons yet unestablished, the BIM setting does not allow the teacher to make, nor the student to perceive, adjustments which would be considered effective.

2. It would appear that when PIM is used in a supplementary manner, an environment is created in which the student can differentiate between the hypothesized "Effective" and "Ineffective" instructional adjustments. These discriminations are in favor of the teachers who employed "Effective" instructional adjustments.

3. Programmed instruction generates more favorable student and teacher reaction when employed as a supplementary instructional medium rather than the constant instructional agent.

4. Elementary students found programmed instruction significantly more rewarding than did secondary students. This difference did not evidence itself when elementary and secondary teachers were contrasted.

5. Teachers perceive programmed instruction to be an effective medium of instruction.

6. Programmed instruction can be used under a variety of instructional practices.

7. There is no arbitrary and fixed teacher role for the effective use of programmed instruction.

8. The interest, skill, and enthusiasm of the teacher is a critical component of any instructional medium, and programmed instruction is no exception.

The following conclusions were derived from analysis of the student attitudinal questionnaires administered to over 1400 secondary level (grades 7-12) students:

9. Thirty-six per cent ask more questions than was customary under conventional instruction.

10. Forty-six per cent felt that PIM has made the teacher more effective.

11. Fifty-nine per cent like PIM more than conventional instruction.

12. Sixty per cent find PIM more helpful than regular texts.

13. Sixty-two per cent agree that they can do more independent study because of experience with PIM.

14. Eighty-one per cent feel that they have had more individual teacher attention since adopting PIM.

15. Forty-four per cent find PIM a boring method of learning.

16. Ninety-six per cent feel that a teacher must be available for individual help.

17. More than 80% feel that lectures and discussions should be used in conjunction with PIM.

Recommendations - Phase II

1. Programmed materials should be utilized as supplementary material rather than as the basic instructional agent.

2. Although little support could be marshalled for the hypothesized "Effective" instructional adjustments, local school districts are urged, on the basis of the rational validity of the adjustments, to further investigate these desirable instructional practices.

3. When utilizing programmed instruction, teachers should provide opportunities for discussions, lectures, and individual student help.

4. Provisions should be made by PIM teachers to vary the classroom atmosphere to decrease the incidence of student boredom.

COMMENT

A review of the conclusions and recommendations of the two phases of the study led the investigators to reflect on why there was so little discrimination between those teachers who did and did not use hypothesized effective instructional adjustments. Indeed, why is it so difficult in any study to show differential student attitudes toward groups of teachers who are quite divergent in their instructional practices? Perhaps the answer lies in Carl Rogers' comment:

> . . . in a wide variety of professional work involving relationships with people--whether as a psychotherapist, teacher, religious worker, guidance counselor, social worker, clinical psychologist-- it is the quality of the interpersonal encounter with the client which is the most significant element in determining effectiveness.[4]

The quality of the interpersonal encounter is a variable which this and similar studies have been unable to control. Although Rogers describes the quality of the interpersonal encounter in terms of teacher genuineness, sensitivity, empathic understanding, warmth, prizing of the student, and unconditionality in this positive regard, he is unable to suggest how one goes about measuring these phenomena. It is quite conceivable that the students of a teacher who evidences these characteristics will be favorable in their attitude and performance regardless of the particular technique and supportive material which the teacher employs.

In other words, current research may well be ignoring the most important aspect of the teaching process in an attempt to show differences between techniques.

Despite the fact that student attitudes lent little support to the hypothesized effective instructional adjustments, they did seem to differentiate rather well between elementary and secondary students, and between those teachers who employed PIM as supplementary material and those who used it as the basic instructional medium. These findings tend to support Rogers' position, in that one would expect elementary teachers who use programmed materials in a supplementary manner to have greater opportunity to display genuineness, sensitivity, and the other components of a good interpersonal encounter.

In other words, one is prompted to ask "Do the student attitudes indicate a preference for programmed materials utilized in a supplementary manner, or do they simply reflect the higher quality of the interpersonal encounter possible in a SIM setting?" The same may be asked in regard to the highly favorable position of the elementary students regarding PIM.

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[4] Rogers, Carl, "The Interpersonal Relationship: The Core of Guidance", Harvard Educational Review, Vol. 32, No. 4, Fall 1962, p.416

From these speculations, it is tentatively concluded that regardless of the material support and instructional techniques available to the teacher, it is the quality of the interpersonal encounter which is the most important factor in the learning process.

BIBLIOGRAPHY

The Pennsylvania Department of Public Instruction, "The Teacher, Programmed Materials, and Instructional Interaction: An Assessment of Five Selected Conditions of Teacher and Program Integration." U.S. Office of Education Title VII Grant, Project Number 1120.

Tate, Merle W., Statistics in Education, The Macmillan Company, New York, 1955, p. 439.

The Center for Programed Instruction, Programs '62: A Guide to Programed Instructional Materials Available to Educators by September, 1962. Washington: U.S. Government Printing Office, 1962.

Rogers, Carl, "The Interpersonal Relationship: The Core of Guidance", Harvard Educational Review, Vol. 32, No. 4, Fall 1962, p. 416.

APPENDIX A
Letter of Inquiry

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF PUBLIC INSTRUCTION

Box 911, Harrisburg

September 24, 1962

TO: Chief School Administrators

The Pennsylvania Department of Public Instruction, under a Title VII grant from the U. S. Office of Education, is attempting to identify the administrative and instructional adjustments being made by educators so that programmed materials can be used to best advantage.

The first phase of this project is to identify those public schools in the Commonwealth that will be using programmed learning materials during the 1962-63 school year. We would appreciate your assistance in completing and returning the enclosed card by October 5, 1962.

Sincerely yours,

S. M. Sanzotto, Coordinator
of Programmed Materials
Research Project

SMS:cs

County____________________________________District__________________

1. Are programmed learning materials now being used in your school district?

   Yes______ No______

2. If Yes, in how many schools? ______ In what grades? ______________

   With how many: students?__________ teachers?____________________

3. Total school district enrollment__________________________________

   Elementary__________________________ Secondary____________________

4. Is this your 1st, 2nd, or 3rd year for using programmed learning materials?_____________________

PLEASE RETURN ALL QUESTIONNAIRES.

____

(Name of Chief Administrator - Office Address)

____

(Name of Person Replying - Title)

APPENDIX B

Descriptive Characteristics of Schools, Teachers, Students, and Programs involved in Programmed Instruction in Pennsylvania in 1962-1963.

TABLE B_1

PROGRAMMED INSTRUCTION AND TEACHING LOAD FOR THE 230 TEACHERS AND NUMBER OF STUDENTS USING PI

N Students Using PI	Teacher N Elementary 1-6	Secondary 7-12	Total 1-12	Estimated Student N Elementary 1-6	Secondary 7-12	Total 1-12
1-15	9	21	30	90	210	300
16-30	31	59	90	775	1,475	2,250
31-45	11	27	38	440	1,080	1,520
46-60	1	20	21	55	1,100	1,155
61-75		17	17		1,190	1,190
76-90		5	5		425	425
91-105		10	10		1,000	1,000
106-120		6	6		690	690
120+	2	11	13	260	1,430	1,690
	54	176	230	1,620	8,600	10,220

TABLE B2

GRADE LEVEL OF PROGRAMMED INSTRUCTION USE BY TEACHER

GRADE LEVEL	1-3	4	5	6	7	8	9	10	11	12
TEACHER N	6	27	9	12	14	21	60	41	16	24

TABLE B3

TEACHING EXPERIENCE OF 229 TEACHERS USING PROGRAMMED INSTRUCTIONAL MATERIAL

YEARS OF EXPERIENCE	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17+
TEACHER N	27	32	25	18	17	13	20	11	66

TABLE B4

DEGREE OF PROFESSIONAL TRAINING OF 230 PI TEACHERS

Standard Certificate	A.B. B.A.	M.A. M.S.	M.S.+ 30	Ed.D. Ph.D.
9	127	93	1	0

TABLE B5

PROGRAM TITLES AND PUBLISHERS AS GIVEN BY SCHOOL DISTRICTS AND NUMBER OF TEACHERS USING EACH PROGRAM
(School Year 1962-63)

PUBLISHER	TITLE	TEACHER N
TEMAC (Encyclopaedia Britannica Press)	Algebra I	54
	Algebra II	12
	Introduction to Verbal Prob. in Alg.	1
	Plane Geometry	8
	Solid Geometry	1
	Trigononetry	3
	Calculus I	5
	Basic Mathematics	1
	7th Grade Mathematics	5
	Arithmetic of Whole Numbers	1
	German A	1
HARCOURT, BRACE, AND WORLD	English 2600	55
	English 3200	9
	Numeration	1
	Enrichment - Mathematics A	22
SCIENCE RESEARCH ASSOCIATES	Spelling	1
	Words	20
AMERICAN INSTITUTE RESEARCH TECHNOLOGY	Physics	1
TEACHING MATERIALS INCORPORATED (Grolier)	Algebra Fundamentals - Part 1	2
	Introduction to Modern Mathematics 1	1
	Elementary Arithmetic	3
	Number Sequence	1
	Spelling	5
	Multiplication and Division	2
	Introduction to Numbers	2
	Science - Junior High	2

TABLE B5
(continued)

PUBLISHER	TITLE	TEACHER N
GINN & CO.	Understanding and Using Sets	1
TEACHER MADE	Division	2
	Mathematics (slide rule)	2
	Science	1
LYONS AND CARNAHAN	Chemistry I	1
ILLINOIS MATERIALS	VICSM	2
CORONET	Latitude and Longitude	1

APPENDIX C

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State Department of Education
Salem, Oregon

Dr. B. F. Skinner
Psychology Department
Harvard University
Cambridge, Massachusetts

Lt. Colonel Norman H. Smith,USAF
Department of Mathematics
U. S. Air Force Academy
Denver, Colorado

Dr. Wendell Smith
Psychology Department
Bucknell University
Lewisburg, Pennsylvania

Dr. Olin W. Stead, Director
Instructional Services
State Department of Education
Springfield, Illinois

Dr. Lawrence M. Stolurow
Department of Psychology
University of Illinois
Urbana, Illinois

*Dr. Carl Streams
Supervising Principal
Upper St. Clair Schools
Pittsburgh, Pennsylvania

Dr. J. A. Tucker, Consultant
Educational Methods
Wilmington, Delaware

Dr. Jonathan W. Varty
Technical Consultant
Tutor Text Experimental Project
Garden City, New York

*Dr. Raymond Waller
Assistant Superintendent
Allentown Public Schools
Allentown, Pennsylvania

Mr. R. E. Walther, Manager
U. S. Industries, Inc.
Educational Science Division
250 Park Avenue
New York, New York

*Dr. Daniel Welch
Assistant Superintendent
Newton Public Schools
Newton, Massachusetts

Dr. Ernest Weinrich
Assistant Superintendent
Board of Cooperative Educational Services
Huntington, New York

Dr. George L. White
School Department
Harcourt, Brace & World, Inc.
New York, New York

Dr. S. David Winans
Research and Publications
State Department of Education
Trenton, New Jersey

Dr. Lorne H. Woollatt
Associate Commissioner
Research and Special Studies
State Department of Education
Albany, New York

Dr. Ray Wyman, Director
Audio-Visual Education
University of Massachusetts
Amherst, Massachusetts

Dr. John Yeurisiak, Director
Teaching Machines
Phoenix Associates
Vanadium, New Mexico

* Administrators

APPENDIX D

"Knowledgeable" Persons Questionnaire with Percentage Responses

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF PUBLIC INSTRUCTION
Box 911, Harrisburg

October 18, 1962

Re: Inquiry Concerning the Use of Programmed Materials in Public Schools

The Pennsylvania Department of Public Instruction, under a Title VII grant from the U.S. Office of Education, is attempting to identify the appropriate administrative and instructional adjustments required for the effective use of programmed materials.

In this relatively rapid process of trying out programmed instruction, each school must decide how it will use available materials. Information is especially needed about the administrative and instructional adjustments which are required to ensure the best use of programmed materials. Therefore, we would appreciate it if you would respond to each statement in the enclosed questionnaire.

Your expert judgment will assist in the development of evaluative instruments to ascertain the degree to which public schools are making these adjustments.

If you can return the questionnaire by November 7, 1962, it will greatly expedite this study.

Sincerely yours,

S. M. Sanzotto, Coordinator
Programmed Materials
Research Project

SMS:cw

THE FOLLOWING STATEMENTS ARE POSSIBLE ADMINISTRATIVE AND INSTRUCTIONAL ADJUSTMENTS NEEDED FOR THE EFFECTIVE USE OF PROGRAMMED MATERIALS. PLEASE ASSUME THE PROGRAMMED MATERIALS ARE TO BE USED AS THE BASIC INSTRUCTIONAL MEDIA FOR A COURSE OR GIVEN CONTENT AREA.

I. Please indicate for each statement whether you think it is an "Essential" (E), "Desirable" (D) or "Nonessential" (N) adjustment for the effective use of programmed materials. Circle the letter which shows how you feel.

If you believe the practice suggested by a particular statement is not only nonessential but also actually unsound in practice, circle the NR (Not Recommended) after the statement.

Space has been provided under each statement for any comments you wish to make.

The summary figures are reported in percentage of the total N that responded to the statement.

A. School administrators should:

		Essential	Desirable	Nonessential	Not Recommended	(N)
1.	Provide a special budget for the purchase of programmed materials in addition to the budget for the regular instructional materials.	E 17	D 45	N 9	NR 29	84
2.	Select only the most competent members of the teaching staff to use programmed materials.	E 11	D 38	N 22	NR 29	85
3.	Insist that teachers have programmed instruction training, either in workshops or seminars, before they are permitted to use programmed materials within their classroom.	E 39	D 51	N 8	NR 2	85
4.	Select only teachers to use programmed materials who are sympathetic to their use.	E 35	D 44	N 13	NR 8	84
5.	Orient parents to the reasons for the use of programmed materials prior to their adoption.	E 21	D 56	N 20	NR 3	86
6.	Obtain parental permission for a child to be taught by programmed instruction.	E 5	D 10	N 37	NR 48	86

	Essential E	Desirable D	Nonessential N	Not Recommended NR	(N)
7. Appoint either a full-time or a part-time director to supervise and to coordinate the use of programmed materials.	20	37	28	15	83
8. Arrange in-service programs for staff members prior to using programmed materials.	51	45	4	0	86
9. Arrange for consultants during these in-service sessions.	29	64	5	2	85
10. Arrange for teachers who are going to use programmed materials to attend programmed instruction seminars or workshops.	20	68	12	0	85
11. Require teachers to obtain administrative permission before they are permitted to use programmed materials for instructional purposes.	22	36	22	20	85
12. Establish a policy that specifies the amount of programmed materials to be satisfactorily completed for promotion.	26	23	15	36	82
13. Provide a specific resource room with programmed instructional media for remedial and/or supplementary self-instruction during the school day:	15	73	11	1	66
a. After school	6	84	5	5	81
b. Before school	1	80	11	8	80
c. During study periods	10	84	2	4	82
d. Saturday morning	3	70	17	10	78
e. During summer months	2	77	13	8	79

	Essential E	Desirable D	Nonessential N	Not Recommended NR	(N)
14. Provide special study carrels for use in programmed instruction.	17	49	32	2	84
B. You are no longer reacting to Section A, "School Administrators should" . . . . Please give your personal opinion as to the importance of the following adjustments in the use of programmed materials.					
1. Designated accessible areas are needed in a school for the storage of programmed materials.	48	36	13	3	83
2. Teachers should inform their students of the purpose and of the use of programmed materials prior to using programmed instruction.	78	20	2	0	85
3. Selection of programmed materials should be based on the educational objectives established for the course.	90	10	0	0	78
4. Subject curriculum committees should select programmed materials.	40	48	11	1	81
5. A staff committee should select the students to use programmed materials.	1	26	45	28	82
6. Teachers should use units from a variety of programmed courses in the same subject.	1	18	39	42	80
7. The master subject (or class) schedule should be constructed so as to expedite student advancement to the next course sequence upon the satisfactory completion of programmed materials without regard to the time of the academic year by which materials are completed.	35	50	6	3	86

	Essential	Desirable	Nonessential	Not Recommended	
8. Course credit should be given to a student upon the satisfactory completion of a programmed course regardless of time expended:	E	D	N	NR	(N)
a. Elementary	27	45	16	12	- 77
b. Secondary	32	56	5	7	- 81
9. Teachers should use appropriate audio-visual aids, materials, and supplementary experiences, in addition to programmed instruction materials.	E 60	D 37	N 2	NR 1	- 85
10. Teacher aides should be used for clerical duties so that programmed instruction teachers can do more creative teaching.	E 28	D 59	N 11	NR 2	- 83

II. Please indicate for each statement whether you "Agree" (A) or "Disagree" (D) with the statement. Circle the letter which shows how you feel.

Space has been provided under each statement for any comments you wish to make.

	Agree	Disagree	
A. Teachers with experience in writing programmed materials will be more effective in:	A	D	(N)
1. Programmed instruction	94	6	- 79
2. Conventional instruction	95	5	- 79
B. Evaluation based on the "normal curve" (group norms or standards) is inappropriate for programmed instruction.	A 68	D 32	- 75
C. The class should be organized to permit group work on programmed materials.	A 60	D 40	- 77

		Agree A	Disagree D	(N)
D.	Programmed materials should be used whenever appropriate for specific students, regardless of the publisher's grade placement.	99	1	- 85
E.	Programmed instruction can be effectively used with the following students:	A	D	
	1. Gifted	97	3	- 82
	2. Retarded	96	4	- 78
	3. Average	100	0	- 82
	4. Homebound	100	0	- 81
	5. For students who desire a course for which there is no teacher available.	91	0	- 81
F.	Each student within a class should be permitted to complete an entire program at his own rate. (There is no pace restriction.)	A 83	D 17	- 79
G.	A specific number of programmed frames should be assigned to the class for completion within a specific period of time. (There is pace restriction.)	A 15	D 85	- 81

H. The number of programmed courses a student can enroll in, at any one time, should be limited to: (Consider each course equivalent to one Carnegie credit.)

1. One	12	- 51
2. Two	33	- 51
3. Three	10	- 51
4. Four or more	45	- 51

I. Which of the following would you recommend in a classroom situation? Please rank, one through four, one (1) being the Most effective use, and four (4) the Least effective.

		Rank Order 1	2	3	4	(N)
1. Students should complete the programmed materials in the classroom under the supervision of a proctor who is unqualified to answer questions raised by individual students.		1	2	3	4	
	N	1	1	4	73	- 79
	%	1	1	5	93	
2. Programmed materials to be used during the scheduled class period under the supervision of a qualified teacher who would only answer questions raised by individual students.		1	2	3	4	
	N	5	19	53	2	- 79
	%	6	24	67	3	
3. Programmed materials to be used during the scheduled class period supplemented by teacher-led discussion and related educational learning experiences.		1	2	3	4	
	N	54	22	2	1	- 79
	%	68	28	3	1	
4. Programmed materials to be completed sometime other than the scheduled class period. The class period to be used by the teacher to emphasize educational experiences beyond that which programmed materials alone can contribute.		1	2	3	4	
	N	23	33	19	4	- 79
	%	29	42	24	5	

J. Who should select students for programmed instruction? (Check one)

1. Classroom teacher 52 - 76

2. Staff committee 7 - 76

3. Administrators 0 - 76

4. Combination of any of the above (Indicate the combination) 41 - 76

K. Please check the one student group that programmed instruction can best serve.

1. Gifted 26 - 57

		(N)
2. Retarded	7	- 57
3. Average	30	- 57
4. Homebound	14	- 57
5. For students who desire a course for which there is no teacher available.	23	- 57

L. Programmed materials can be effectively used to meet a variety of instructional needs. Which of the following do you feel to be:
1. The most important use? (Please check appropriate space)
2. The least important use? (Please check appropriate space)

	Least	(N)	Most	(N)
a. Basic course materials	8	- 53	69	- 45
b. Enrichment	15	- 53	9	- 45
c. Homework	30	- 53	4	- 45
d. Remedial work	4	- 53	7	- 45
e. Advanced work	11	- 53	7	- 45
f. Review	32	- 53	4	- 45

Please describe the most defensible procedure for evaluating pupil performance when programmed materials are being used as The Basic Instructional Media.

The summary of the responses is as follows:

1. The objectives of instruction are not changed because of the media used; therefore, the usual evaluation methods can be used.

2. Student's growth should be compared with an estimate of his ability to grow. Any comparison of one student's work with that of another student is misleading.

3. Only use programmed materials that have unit achievement tests. These test results should be used along with the results obtained from teacher constructed and standardized tests.

Please turn to the next page.

What are the crucial factors limiting the use of programmed materials in public schools?

Crucial factors limiting the use of programmed materials.

1. The shortage of suitable programs--both quantity and quality.
2. Materials too expensive.
3. Lack of adaptability of programs to curricular areas already established by the schools.
4. Lack of knowledge on the part of administrators, supervisors, and teachers concerning programmed instruction.
5. The lack of knowledge of the teacher's role in the use of programmed materials.
6. Lack of adequate test to go with the programs.

____
Person Replying

____
Position

____
Address

____

____

____
Telephone Number

Please indicate if you would like a copy of final report______________________
Final Report

APPENDIX E

Administrators' Questionnaire with Percentage Responses

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF PUBLIC INSTRUCTION
Box 911, Harrisburg

January 14, 1963

The Pennsylvania Department of Public Instruction, through a Title VII grant from the U.S. Office of Education, is identifying the administrative and instructional adjustments needed for the successful use of programmed materials.

Since your school system is now using programmed materials, we trust that you and your staff will be willing to share your experiences in the use of these materials by responding to each statement in the enclosed questionnaire.

We would appreciate your cooperation in having you or your administrative representative and your teachers independently complete the questionnaires contained in this envelope. The one questionnaire is for the administrator most responsible for the use of these materials and the others are for the teachers using programmed instructional materials. Please inform me if you need additional teacher questionnaires.

In order to facilitate receiving the completed questionnaires, we would appreciate it if you would collect and return all questionnaires in the self-addressed envelope.

A guide for administrators and teachers will be published at the conclusion of this study. This guide will benefit those schools using programmed instructional materials as well as those schools contemplating the use of programmed instructional materials. Copies will be supplied to all chief public school administrators in the Commonwealth of Pennsylvania.

Please make every effort to return the completed questionnaire by February 1, 1963. Your return of these questionnaires by this date will greatly expedite the study, and thereby make it possible to inform you of the results at an earlier date.

Sincerely yours,

S. M. Sanzotto, Coordinator
Programmed Materials Project

SMS:s

ADMINISTRATOR'S QUESTIONNAIRE

The summary figures are reported in percentages of the total N that responded to the statement.

County　　　　　　School

Address

Name of Chief School Administrator　　　　Telephone Number

Name of Person Replying　　　　Title

Please indicate the programmed instructional materials which your school system is using or planning to use during the 1962-63 school year. (If you need additional space, please attach additional sheet)

Title (T) & Publisher (P)	A*	B	C	D
Example:				
(T) Symbolic III	9	60	2	2
(P) Plato Pub. Company				
1. (T)				
(P)				
2. (T)				
(P)				
3. (T)				
(P)				
4. (T)				
(P)				
5. (T)				
(P)				

*Code

A. Grade level
B. Number of students using
C. Number of teachers using
D. Number of schools using

In the first section of this questionnaire, please indicate at the right of each statement, the procedure your school system follows in the use of programmed materials. Please circle YES or NO.

After you have responded YES or NO to an item, we would like your assessment of the procedure. Do you now think after using this procedure, that it is Highly Essential (HE) or Nonessential (N) for the effective use of programmed materials? Please circle HE (Highly Essential) or N (Nonessential.)

Even if your system did not use a particular procedure and you indicated a response of NO, would you still indicate in your judgment whether you consider the procedure Highly Essential (HE) or Nonessential (N) for the effective use of programmed materials. Please circle HE (Highly Essential) or N (Nonessential) in every instance.

EXAMPLE:

School W	Conventional textbooks are used to supplement programmed instructional materials.	[✓ YES]	NO	[✓ HE]	N
School X	Conventional textbooks are used to supplement programmed instructional materials.	[✓ YES]	NO	HE	[✓ N]
School Y	Conventional textbooks are used to supplement programmed instructional materials	YES	[✓ NO]	[✓ HE]	N
School Z	Conventional textbooks are used to supplement programmed instructional materials.	YES	[✓ NO]	HE	[✓ N]

SPACE IS PROVIDED FOLLOWING EACH STATEMENT FOR ANY COMMENT YOU MAY WISH TO MAKE.

				Highly Essential	Non-Essential	
1.	In-service programs are conducted for staff members prior to the staff using programmed materials.	YES 59	NO 41	HE 82	N 13	(N) - 82
2.	Programmed instruction consultants are used during these in-service sessions.	YES 40	NO 60	HE 61	N 27	- 80

		YES	NO	HE Highly Essential	N Non-Essential	(N)
3.	Workshop or seminar participation is required of all teachers before they use programmed materials in their class.	22	78	54	37	81
4.	Only teachers sympathetic to the use of programmed materials are selected to use these materials.	89	11	84	11	80
5.	Teachers inform their students of the purposes and of the use of programmed materials prior to using programmed instruction.	99	1	94	1	84
6.	Programmed materials are used on a small-scale tryout basis prior to the adoption of these materials by the school system.	88	12	86	8	84
7.	A teacher or administrator has been released full-time or part-time to coordinate and/or to supervise the use of programmed materials.	16	84	29	56	83
8.	Subject-teacher curriculum committees select the programmed materials.	46	54	81	33	83
9.	A staff committee (teachers and administrators) determines and/or selects the students to use programmed materials.	74	26	65	25	84
10.	Programmed materials are used whenever appropriate for specific students, regardless of the publisher's grade placement.	76	24	60	22	79
11.	Assessment procedures are used to enable the teacher:					
	a. To determine whether or not individual students will be permitted to eliminate certain units of the programmed course.	37	63	41	43	79
	b. To determine the individual student's readiness for the programmed course.	54	46	62	25	79

		YES	NO	Highly Essential HE	Non-Essential N		(N)
c.	To determine if a child may completely by-pass the programmed course and commence with the next higher sequence of content.	33	67	44	39	-	78
d.	To diagnose weaknesses that must be attended to before the student may be able to use the programmed materials.	58	42	68	15	-	79
12.	Only teachers having a thorough knowledge of the subject content may be allowed to use programmed materials in the classroom covering that particular subject.	83	17	80	13	-	83
13.	The most competent members of the teaching staff are selected to use programmed materials.	66	34	57	38	-	76
14.	Programmed instruction teachers use units from a variety of programmed courses covering the same subject.	13	87	20	64	-	83
15.	Students complete the programmed materials in school under the supervision of a proctor who is unqualified to answer questions raised by individual students.	5	95	21	59	-	84
16.	Students complete the programmed materials during the scheduled class period under the supervision of a qualified teacher who only answers questions raised by individual students.	57	43	43	42	-	84
17.	Students complete programmed materials during the scheduled class period with the teacher supplementing the materials by teacher-led discussion, and related educational learning experiences.	90	10	71	15	-	83
18.	Students complete the programmed materials at their own convenience but not during the scheduled class period. The class period is used by the teacher to emphasize educational experiences beyond that	23	77	21	54	-	80

			Highly Essential	Non-Essential	
which programmed materials alone can contribute.	YES	NO	HE	N	(N)
19. Students are given individual or small group assistance by the programmed instruction teacher in areas where the results of a unit test indicate:					
a. Low achievement	YES 96	NO 4	HE 87	N 3	- 83
b. Average achievement	YES 88	NO 12	HE 77	N 11	- 76
c. High achievement	YES 56	NO 44	HE 47	N 39	- 73
20. When programmed materials are used for a particular subject area (example - math), teachers supplement the materials with appropriate aids such as film strips, graphs, charts, diagrams, models, etc.	YES 73	NO 27	HE 75	N 15	- 84
21. Teacher aides are used to assist the programmed instruction teachers with clerical duties, so that the programmed instruction teachers can do more creative teaching and planning.	YES 3	NO 97	HE 31	N 50	- 83
22. Please indicate the following teaching techniques programmed instruction teachers use, with their programmed instruction students, in addition to the programmed materials.					
a. Student committee reports and projects.	YES 39	NO 61	HE 34	N 53	- 74
b. Individual student reports	YES 47	NO 53	HE 36	N 48	- 76
c. Library reference assignments	YES 49	NO 51	HE 44	N 42	- 75
d. Group discussions	YES 78	NO 22	HE 74	N 16	- 77
e. Lectures	YES 73	NO 27	HE 56	N 30	- 72
f. Demonstrations	YES 84	NO 16	HE 74	N 13	- 76
g. Seminars	YES 22	NO 78	HE 28	N 55	- 71

	YES	NO	Highly Essential HE	Non-Essential N	(N)
23. Students use programmed instructional materials to acquire basic skills and facts at a rate appropriate to their individual abilities. (Example - Students with lower ability are not expected to go as fast, nor to have the same degree of mastery as those students with high ability.)	100	0	90	3	81
24. A specific resource room with programmed instructional media for remedial and/or supplementary self-instruction is provided during:					
a. The school day	20	80	47	25	79
b. After school	15	85	32	40	78
c. Before school	15	85	32	40	79
d. Saturday morning	5	95	15	55	78
e. During summer months	13	87	31	44	78
25. Students using programmed instructional materials as the basic instructional materials for a given course, are permitted to use and to work on these materials:					
a. At home					
(1) Over the weekend	66	34	46	35	79
(2) Over vacation	54	46	42	41	77
(3) Over night	69	31	51	31	80
b. At school					
(1) Before school	69	31	46	33	76
(2) After school	68	32	49	31	76
(3) During study periods	78	22	51	28	79
c. Other ____________________					

		YES	NO	Highly Essential HE	Non-Essential N	(N)
26.	Each student within a programmed instruction class is permitted to progress at his own rate:					
a.	For the entire program	82	18	71	18	- 79
b.	For the entire program, but each student must complete by a specific date, the material up to and including a certain frame or section. (i.e. -- by November 15, every student must be at frame 450; you can go beyond this frame, but this is a minimum.)	53	47	52	37	- 71
c.	Up to and including the unit (chapter) test, then he must wait for the rest of the class before going on to the next unit.	8	92	15	68	- 72
d.	Only for the material assigned for the class period (example - frames 1-20 for today - at frame 20 he must stop).	8	92	17	67	- 72
27.	When a student has satisfactorily learned the content of the programmed instruction program, he can advance to the next course sequence regardless of the time of the academic year.	63	37	68	22	- 76
28.	Course or subject credit is given to students upon the satisfactory completion (degree of mastery) of a programmed course regardless of time expended.	74	26	67	20	- 79
29.	Students who have not attained sufficient mastery of the programmed materials during the regular school year are permitted to work on these materials during the summer months for retesting and course credit.	37	63	54	33	- 76
30.	Students in a programmed instruction class:					

		YES	NO	Highly Essential HE	Non-Essential N	(N)
	a. Start each and every unit of a programmed course together.	8	92	22	64	78
	b. Start only the first two or three units of a programmed course together.	78	22	52	33	75
31.	Students are required to attain a minimum acceptable score on the unit tests before they are permitted to move on to the next unit in the programmed course.	87	13	84	6	81
32.	When each programmed instruction student is ready to proceed to the next higher unit, the materials are always available. (The student does not have to wait until another student has finished using those needed materials.)	93	7	89	1	82
33.	Evaluation of a student's progress when using programmed materials is based:					
	a. On the relationship of his performance as compared to his expected or predicted performance.	54	46	51	34	73
	b. On the relationship of his performance as compared to the rest of the group.	38	62	31	57	71
	c. On the percent of content he has mastered without considering the group average or his ability.	59	41	50	37	76
34.	A special budget is provided for the purchase of programmed materials in addition to the budget for the regular instructional materials.	23	77	32	50	81
35.	Programmed materials selected for the child are based on the educational objectives established for the course.	87	13	76	11	80
36.	Designated accessible areas, other than the classroom, are provided in the school for the storage of programmed materials.	25	75	35	46	80

			Highly Essential	Non-Essential		
37. Teachers must obtain administrative permission before they are permitted to use programmed materials for instructional purposes.	YES	NO	HE	N		(N)
	86	14	76	14	-	79
38. Parents are oriented to the reasons for using programmed instruction prior to the adoption of programmed materials.	YES	NO	HE	N		
	36	64	49	39	-	81
39. Parental permission is obtained before a child is taught by programmed instruction.	YES	NO	HE	N		
	5	95	5	80	-	83
40. Progress report (report card) to parents indicates for students using programmed materials:						
a. The degree of mastery of the content completed.	YES	NO	HE	N		
	46	54	51	33	-	70
b. The degree of mastery of the content assigned.	YES	NO	HE	N		
	28	72	32	53	-	68
c. The number of frames completed.	YES	NO	HE	N		
	13	87	14	67	-	70
d. The class average (number) of frames completed.	YES	NO	HE	N		
	11	89	16	67	-	69
e. The class average on each unit test.	YES	NO	HE	N		
	7	93	12	75	-	68
f. Other ______________________						

In this section of the questionnaire, we realize that much experimental research is needed to give definitive answers to some of the following statements. However, we are sure with your experience in the use of programmed materials, you can assist us tremendously by giving your general reaction, to each of the following statements.

Please indicate for each statement whether you "Strongly Agree" (SA), "Agree" (A), "Disagree" (D), or "Strongly Disagree" (SD), with each statement. Circle the abbreviation which shows how you feel.

EXAMPLE:

Programmed instruction students learn, perhaps for the first time, somewhere near their capability and potential.	SA	[✓ A]	D	SD

SPACE IS PROVIDED FOLLOWING EACH STATEMENT FOR ANY COMMENT YOU WISH TO MAKE.

	Strongly Agree	Agree	Disagree	Strongly Disagree	
1. Too much of the class-student time is used in taking tests when using programmed instructional materials.	SA 5	A 10	D 76	SD 9	(N) - 75
2. The teacher can spend more time with individuals or small groups when using programmed materials than was possible with conventional instruction.	SA 48	A 43	D 9	SD 0	- 80
3. Audio-visual aids and devices are used with programmed instruction more than with conventional instruction.	SA 5	A 15	D 74	SD 6	- 79
4. The teacher has generally more time to plan and organize special lectures and/or demonstrations when using programmed instruction than was possible when using conventional instruction.	SA 12	A 43	D 37	SD 8	- 78
5. When using programmed instructional materials, the student's reading comprehension generally improves more than it does under conventional instruction. (Example - In an Algebra I or Science Class, etc.)	SA 16	A 68	D 14	SD 2	- 71

		Strongly Agree	Agree	Disagree	Strongly Disagree	
6.	Because students are using programmed instructional materials resource books get more attention.	SA 4	A 27	D 68	SD 1 -	(N) 74
7.	When discussion sessions are available in the programmed instruction class, students ask questions more than was customary under conventional instruction.	SA 11	A 50	D 35	SD 4 -	72
8.	The retention of knowledge learned through the use of programmed instruction is generally:					
	a. Equivalent to that of conventional instruction.	SA 6	A 62	D 30	SD 2 -	63
	b. Greater than that of conventional instruction.	SA 5	A 44	D 48	SD 3 -	64
	c. Less than that of conventional instruction.	SA 2	A 7	D 82	SD 9 -	58
9.	Programmed instruction students achieve more than they did when using conventional instruction.	SA 13	A 54	D 32	SD 1 -	69
10.	Programmed instruction limits a student's creativity more than conventional instruction does.	SA 11	A 46	D 39	SD 4 -	76
11.	A greater number of individual study projects are selected by students in conjunction with the use of programmed materials than are selected in conjunction with conventional instruction.	SA 1	A 21	D 73	SD 5 -	70
12.	Programmed instruction does as well as conventional instruction in providing interaction:					
	a. Among students	SA 1	A 46	D 45	SD 8 -	77
	b. Between teacher and student	SA 14	A 65	D 17	SD 4 -	79

		Strongly Agree	Agree	Disagree	Strongly Disagree	
13.	The student is more concerned with the speed of completion rather than mastery of the subject when using programmed materials.	SA 5	A 32	D 60	SD 3	(N) - 75
14.	Programmed instruction provides a saving of class time in the satisfactory completion and mastery of content as compared to the conventional lecture-discussion method of instruction.	SA 19	A 58	D 23	SD 0	- 74
15.	Programmed instruction students demonstrate more interest in continuing or broadening their education in related subjects than students taught by conventional instruction.	SA 8	A 39	D 50	SD 3	- 72
16.	The number of disciplinary problems resulting from the use of programmed instructional materials is:					
	a. Greater than those resulting from the use of conventional instruction.	SA 3	A 4	D 70	SD 23	- 69
	b. Less than those resulting from the use of conventional instruction.	SA 18	A 38	D 40	SD 4	- 73
	c. About the same as those resulting from the use of conventional instruction.	SA 0	A 53	D 37	SD 10	- 70
17.	Programmed instruction has made the teacher more effective in his conventional teaching.	SA 18	A 63	D 19	SD 0	- 76
18.	Students like programmed instruction more than they do conventional instruction.	SA 12	A 51	D 32	SD 5	- 75.
19.	I would recommend programmed instruction to other school teachers and administrators.	SA 20	A 77	D 3	SD 0	- 74
20.	We plan to broaden the use of programmed instruction during the 1963-64 school year. (Please circle YES or NO)	YES 76		NO 24		- 75

Please accept our sincere thanks for your cooperation in this study.

APPENDIX F

Teachers' Questionnaire with Percentage Responses

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF PUBLIC INSTRUCTION
Box 911, Harrisburg

January 14, 1963

Dear Programmed Instruction Teacher:

The Pennsylvania Department of Public Instruction, through a Title VII grant from the U.S. Office of Education, is identifying the administrative and instructional adjustments needed for the successful use of programmed materials.

Since your school system is using programmed materials, we trust that you as a teacher using these materials will be willing to share your experiences and judgment by responding to each statement in the attached questionnaire.

A guide for administrators and teachers will be published at the conclusion of this study. This guide will benefit those schools using programmed instructional materials as well as those schools contemplating the use of programmed instructional materials. Copies will be supplied to all chief public school administrators in the Commonwealth of Pennsylvania.

Please be candid in your responses because the validity of our findings depends, almost completely, on your sincere and frank assessment of this new approach to teaching.

In order to facilitate the return of the completed questionnaire, please return the questionnaire to your chief school administrator prior to February 1, 1963. Your return of this questionnaire prior to this date will greatly expedite the study, and thereby make it possible to inform you of the results at an earlier date.

Sincerely yours,

S. M. Sanzotto, Coordinator
Programmed Materials Project

SMS:s

TEACHER'S QUESTIONNAIRE

The summary figures are reported in percentages of the total N that responded to the statement.

County

School

Address of School

Name of Teacher Replying

1. Years of teaching experience including current school year ______
2. Years of using programmed instructional materials including current school year - - - - - - - - - - - - - - ______
3. Highest degree you hold - - - - - - - - - - - - - - - - - - ______
4. Major area (s) of certification - - - - - - - - - - - - - ______

Please indicate below the programmed materials you are using this school year.

Title (T) & Publisher (P)	A*	B	C	D	E
Example:					
(T) Symbolic III	9	60	1	[✓ M], T, [✓ W], TH, [✓ F]	1
(P) Plato Pub. Co.					
1. (T)				M, T, W, TH, F	
(P)					
2. (T)				M, T, W, TH, F	
(P)					
3. (T)				M, T, W, TH, F	
(P)					

* Code

A. Grade level
B. Number of students using
C. Number of years using materials
D. Please circle the days of the week you meet your programmed instruction students
E. Place appropriate number (s) stating your purpose

1. Basic course materials
2. Enrichment materials
3. Homework materials
4. Remedial materials
5. Advanced work materials
6. Review materials
7. Other (specify)

If you need additional space for any items, please attach additional sheet.

In the first section of this questionnaire, please indicate at the right of each statement, the procedure your school system follows in the use of programmed materials. Please circle YES or NO.

After you have responded YES or NO to an item, we would like your assessment of the procedure. Do you now think after using this procedure, that it is Highly Essential (HE) or Nonessential (N) for the effective use of programmed materials? Please circle HE (Highly Essential) or N (Nonessential).

Even if your system did not use a particular procedure and you indicated a response of NO, would you still indicate in your judgment whether you consider the procedure Highly Essential (HE) or Nonessential (N) for the effective use of programmed materials. Please circle HE (Highly Essential) or N (Nonessential) in every instance.

EXAMPLE:

School W	Conventional textbooks are used to supplement programmed instructional materials.	[✓ YES]	NO	[✓ HE]	N
School X	Conventional textbooks are used to supplement programmed instructional materials.	[✓ YES]	NO	HE	[✓ N]
School Y	Conventional textbooks are used to supplement programmed instructional materials.	YES	[✓ NO]	[✓ HE]	N
School Z	Conventional textbooks are used to supplement programmed instructional materials.	YES	[✓ NO]	HE	[✓ N]

SPACE IS PROVIDED FOLLOWING EACH STATEMENT FOR ANY COMMENT YOU MAY WISH TO MAKE.

			Highly Essential	Non-Essential	
	YES	NO	HE	N	(N)
1. Only teachers having a thorough knowledge of the subject content may be allowed to use programmed materials in the classroom covering that particular subject.	78	22	81	16	- 226
	YES	NO	HE	N	
2. The most competent members of the teaching staff are selected to use programmed materials.	55	45	60	37	- 213

		YES	NO	Highly Essential HE	Non-Essential N	(N)
3.	As a programmed instruction teacher you use units from a variety of programmed courses covering the same subject.	10	90	21	74	228
4.	Students complete the programmed materials in school under the supervision of a proctor who is unqualified to answer questions raised by individual students.	4	96	33	53	229
5.	Students complete the programmed materials during the scheduled class period under the supervision of a qualified teacher who only answers questions raised by individual students.	59	41	61	34	227
6.	Students complete programmed materials during the scheduled class period with the teacher supplementing the materials by teacher-led discussion, and related educational learning experiences.	65	35	75	23	223
7.	Students complete the programmed materials at their own convenience but not during the scheduled class period. The class period is used by the teacher to emphasize educational experiences beyond that which programmed materials alone can contribute.	19	81	28	63	225
8.	Programmed instruction students are given individual or small group assistance by you in areas where the results of a unit test indicate:					
	a. Low achievement	90	10	93	5	219
	b. Average achievement	68	32	69	27	204
	c. High achievement	38	62	39	57	195
9.	When programmed materials are used for a particular subject area (example - math), you supplement the materials with appropriate aids such as film strips, graphs, charts, diagrams, models, etc.	62	38	71	24	223

	YES	NO	Highly Essential HE	Non-Essential N	(N)
10. Teacher aides are used to assist the programmed instruction teachers with clerical duties, so that the programmed instruction teachers can do more creative teaching and planning.	8	92	50	42	227
11. Please indicate the following teaching techniques that you use with programmed instruction students in addition to the programmed materials. (Please be sure to indicate HE or N for all items.)					
a. Student committee reports and projects	26	74	29	65	214
b. Individual student reports	39	61	38	56	218
c. Library reference assignments	33	67	35	59	215
d. Group discussions	71	29	73	22	222
e. Lectures	57	43	55	41	214
f. Demonstrations	66	34	72	25	219
g. Seminars	14	86	23	72	208
12. In-service programs are conducted for staff members prior to the staff using programmed materials.	30	70	69	26	228
13. Programmed instruction consultants are used during these in-service sessions.	27	73	63	30	218
14. Workshop or seminar participation is required of all teachers before they use programmed materials in their class.	18	82	53	44	227
15. Only teachers sympathetic to the use of programmed materials are selected to use these materials.	61	39	77	21	221
16. Teachers inform their students of the purposes and of the use of programmed materials prior to using programmed instruction.	97	3	97	2	229

		YES	NO	Highly Essential HE	Non-Essential N	(N)
17.	Programmed materials are used on a small-scale tryout basis prior to the adoption of these materials by the school system.	86	14	85	13	- 226
18.	A teacher or administrator has been released full-time or part-time to coordinate and/or to supervise the use of programmed materials.	18	82	46	49	- 226
19.	Subject-teacher curriculum committees select the programmed materials.	28	72	60	33	- 222
20.	A staff committee (teachers and administrators) determines and/or selects the students to use programmed materials.	46	54	62	32	- 221
21.	Programmed materials are used whenever appropriate for specific students, regardless of the publisher's grade placement.	67	33	68	16	- 221
22.	Assessment procedures are used to enable the teacher:					
a.	To determine whether or not individual students will be permitted to eliminate certain units of the programmed course.	33	67	57	32	- 164
b.	To determine the individual student's readiness for the programmed course.	42	58	71	23	- 218
c.	To determine if a child may completely by-pass the programmed course and commence with the next higher sequence of content.	19	81	49	43	- 215
d.	To diagnose weaknesses that must be attended to before the student may be able to use the programmed materials.	40	60	70	23	- 218
23.	Students use programmed instructional materials to acquire basic skills and facts at a rate appropriate to their individual abilities. (Example - Students	89	11	89	6	- 228

with lower ability are not expected to go as fast, nor to have the same degree of mastery as those students with high ability.)

24. A specific resource room with programmed instructional media for remedial and/or supplementary self-instruction is provided during:

	YES	NO	Highly Essential HE	Non-Essential N	(N)
a. The school day	19	81	43	46	226
b. After school	10	90	32	57	217
c. Before school	8	92	27	63	217
d. Saturday morning	1	99	11	79	217
e. During summer months	12	88	31	58	216

25. Students using programmed instructional materials as the basic instructional materials for a given course, are permitted to use and to work on these materials:

	YES	NO	HE	N	(N)
a. At home					
(1) Over the weekend	62	38	56	41	199
(2) Over vacation	51	49	45	51	195
(3) Over night	65	35	60	36	205
b. At school					
(1) Before school	60	40	47	46	198
(2) After school	59	41	47	47	198
(3) During study periods	73	27	57	38	209

c. Other ______________________________

		YES	NO	Highly Essential HE	Non-Essential N	(N)
26.	Each student within a programmed instruction class, is permitted to progress at his own rate:					
a.	For the entire program.	74	26	69	24	223
b.	For the entire program, but each student must complete by a specific date, the material up to and including a certain frame or section. (i.e. - by November 15, every student must be at frame 450; you can go beyond this frame, but this is a minimum.)	51	49	57	36	219
c.	Up to and including the unit (chapter) test, then he must wait for the rest of the class before going on to the next unit.	11	89	18	75	221
d.	Only for the material assigned for the class period (example - frames 1-20 for today - at frame 20 he must stop).	11	89	19	73	222
27.	When a student has satisfactorily learned the content of the programmed instruction program, he can advance to the next course sequence regardless of the time of the academic year.	63	37	76	20	219
28.	Course or subject credit is given to students upon the satisfactory completion (degree of mastery) of a programmed course regardless of time expended.	65	35	70	26	220
29.	Students who have not attained sufficient mastery of the programmed materials during the regular school year are permitted to work on these materials during the summer months for retesting and course credit.	30	70	47	47	214
30.	Students in a programmed instruction class:					
a.	Start each and every unit of a programmed course together.	21	79	18	80	221

	YES	NO	Highly Essential HE	Non-Essential N	(N)
b. Start only the first two or three units of a programmed course together.	51	49	42	54	- 220
31. Students are required to attain a minimum acceptable score on the unit tests before they are permitted to move on to the next unit in the programmed course.	75	25	84	13	- 224
32. When each programmed instruction student is ready to proceed to the next higher unit, the materials are always available. (The student does not have to wait until another student has finished using those needed materials.)	86	14	96	6	- 225
33. Evaluation of a student's progress when using programmed materials is based:					
a. On the relationship of his performance as compared to his expected or predicted performance.	50	50	55	40	- 217
b. On the relationship of his performance as compared to the rest of the group.	40	60	34	63	- 212
c. On the percent of content he has mastered without considering the group average or his ability.	49	51	50	44	- 214
34. Programmed materials selected for the child are based on the educational objectives established for the course.	91	9	91	6	- 228
35. Designated accessible areas, other than the classroom, are provided in the school for the storage of programmed materials.	29	71	41	55	- 228
36. Teachers must obtain administrative permission before they are permitted to use programmed materials for instructional purposes.	80	20	73	21	- 226
37. Parents are oriented to the reasons for using programmed instruction prior to the adoption of programmed materials.	35	65	57	38	- 223

	YES	NO	Highly Essential HE	Non-Essential N	(N)
38. Parental permission is obtained before a child is taught by programmed instruction.	9	91	12	82	- 226
39. Progress report (report card) to parents indicates for students using programmed materials:					
a. The degree of mastery of the content completed.	53	47	62	31	- 216
b. The degree of mastery of the content assigned.	34	66	44	48	- 205
c. The number of frames completed.	9	91	18	73	- 204
d. The class average (number) or frames completed.	9	91	16	75	- 204
e. The class average on each unit test.	8	92	13	79	- 203
f. Other ______________________					

In this section of the questionnaire, we realize that much experimental research is needed to give definitive answers to some of the following statements. However, we are sure with your experience in the use of programmed materials, you can assist us tremendously by giving your general reaction, to each of the following statements.

Please indicate for each statement whether you "Strongly Agree" (SA), "Agree" (A), "Disagree" (D), or "Strongly Disagree" (SD), with each statement. Circle the abbreviation which shows how you feel.

EXAMPLE:

> Programmed instruction students learn, perhaps for the first time, somewhere near their capability and potential. SA A D SD

SPACE IS PROVIDED FOLLOWING EACH STATEMENT FOR ANY COMMENT YOU WISH TO MAKE.

		Strongly Agree	Agree	Disagree	Strongly Disagree	
1.	Too much of the class-student time is used in taking tests when using programmed instructional materials.	SA 4	A 11	D 66	SD 19	(N) - 227
2.	The teacher can spend more time with individuals or small groups when using programmed materials than was possible with conventional instruction.	SA 37	A 50	D 11	SD 2	- 230
3.	Audio-visual aids and devices are used with programmed instruction more than with conventional instruction.	SA 1	A 15	D 70	SD 14	- 221
4.	The teacher has generally more time to plan and organize special lectures and/or demonstrations when using programmed instruction than was possible when using conventional instruction.	SA 6	A 32	D 43	SD 19	- 227
5.	When using programmed instructional materials, the student's reading comprehension generally improves more than it does under conventional instruction. (Example - In an Algebra I or Science Class, etc.)	SA 13	A 59	D 25	SD 3	- 218

	Strongly Agree SA	Agree A	Disagree D	Strongly Disagree SD	(N)
6. Because students are using programmed instructional materials, resource books get more attention.	3	35	55	7	222
7. When discussion sessions are available in the programmed instruction class, students ask questions more than was customary under conventional instruction.	6	44	43	7	220
8. The retention of knowledge learned through the use of programmed instruction is generally:					
a. Equivalent to that of conventional instruction.	10	56	31	3	197
b. Greater than that of conventional instruction.	8	41	46	5	202
c. Less than that of conventional instruction.	4	14	70	12	185
9. Programmed instruction students achieve more than they did when using conventional instruction.	14	48	35	3	213
10. Programmed instruction limits a student's creativity more than conventional instruction does.	9	37	44	10	223
11. A greater number of individual study projects are selected by students in conjunction with the use of programmed materials than are selected in conjunction with conventional instruction.	3	19	72	6	208
12. Programmed instruction does as well as conventional instruction in providing interaction:					
a. Among students	8	36	45	11	218
b. Between teacher and student	16	52	25	7	220

		Strongly Agree	Agree	Disagree	Strongly Disagree	
13.	The student is more concerned with the speed of completion rather than mastery of the subject when using programmed materials.	SA 10	A 32	D 51	SD 7	- 223
14.	Programmed instruction provides a saving of class time in the satisfactory completion and mastery of content as compared to the conventional lecture-discussion method of instruction.	SA 10	A 56	D 30	SD 4	- 222
15.	Programmed instruction students demonstrate more interest in continuing or broadening their education in related subjects than students taught by conventional instruction.	SA 6	A 31	D 58	SD 5	- 210
16.	The number of disciplinary problems resulting from the use of programmed instructional materials is:					
	a. Greater than those resulting from the use of conventional instruction.	SA 3	A 4	D 69	SD 24	- 195
	b. Less than those resulting from the use of conventional instruction.	SA 18	A 33	D 44	SD 5	- 202
	c. About the same as those resulting from the use of conventional instruction.	SA 3	A 54	D 36	SD 7	- 205
17.	Programmed instruction has made the teacher more effective in his conventional teaching.	SA 19	A 48	D 29	SD 4	- 222
18.	Students like programmed instruction more than they do conventional instruction.	SA 14	A 39	D 37	SD 10	- 216
19.	Clerical duties are more demanding when using programmed materials than when using conventional instruction.	SA 37	A 35	D 25	SD 3	- 226
20.	The additional adjustments, resulting from the use of programmed materials, have been frustrating.	SA 4	A 23	D 65	SD 8	- 224
21.	I would recommend programmed instruction to other school teachers and administrators.	SA 23	A 62	D 12	SD 3	- 220

	YES	NO	(N)
22. I plan to continue to use programmed materials during the 1963-64 school year.	96	4	- 187

Please accept our sincere thanks for your cooperation in responding to each item in this questionnaire.

Please return the completed questionnaire to your chief school administrator so that he can forward the questionnaire in the self-addressed envelope to:

Samuel M. Sanzotto, Coordinator
Programmed Materials Research Project
Department of Public Instruction
Room 374 Education Building
Harrisburg, Pennsylvania

APPENDIX G

SCHOOL ADMINISTRATIVE UNITS INCLUDED IN THE STUDY

Adams County: Gettysburg Joint

Allegheny County: Baldwin-Whitehall, Bethel Park, Brentwood Borough, Hampton Township, Har Brack Joint, Mount Lebanon Township, Oakmont Borough, Pittsburgh City, Turtle Creek Borough, Upper St. Clair Township, West Allegheny Joint, West Deer Township, West Jefferson Hill Union, West Mifflin Area, Wilkinsburg Borough

Beaver County: Ambridge Area, Baden Economy, Hopewell-Independence Raccoon Joint, Monaco Borough

Berks County: Muhlenburg Township, Reading City

Blair County: Hollidaysburg Borough

Bradford County: Sayre Area Joint, Smithfield-Ridgeway-Ulster Joint, Troy Community Joint

Bucks County: Bensalem Township, Bristol Township, Council Rock Joint, Deep Run Valley Joint, Pennsbury Joint

Cambria County: Westmont Hilltop Joint

Centre County: College Area Joint

Chester County: Coatesville Area Joint, Paoli Area Joint, West Chester Joint

Clearfield County: Philipsburg-Osceola Area Joint

Columbia County: Berwick Area Joint, Southern Area Joint

Crawford County: Titusville Area Joint

Cumberland County: Cumberland Valley Joint, South Middleton Township

Dauphin County: Central Dauphin Joint, Harrisburg City, Williamstown Borough

Delaware County: Chester City, Marple-Newton Joint, Media Borough

Erie County: Erie City

Lackawanna County: Scranton City

Lancaster County: Elizabethtown, Lampeter-Strasburg Union, Warwick Union

3

Lawrence County: Ellwood City, Laurel Union, Neshannock Township

Lehigh County: Allentown City, East Penn Union

Lycoming County: Montgomery Area Joint

McKean County: Kane Area Joint, Otto-Eldred Joint

Mifflin County: Lewistown Borough

Monroe County: East Stroudsburg Area Joint

Montgomery County: Cheltenham Township, East Norriton Township, Hatboro Borough, Lower Merion Township, Norristown Borough, North Penn Joint, Schwenksville Union, Souderton Area Joint, Springfield Township, Spring-Ford Joint, Upper Dublin Township, Upper Merion Township

Northampton County: Easton City, Wilson Borough Area Joint

Northumberland County: Sunbury Area Joint

Perry County: Newport Union, Susquenita Joint

Philadelphia County: Philadelphia City

Schuylkill County: Pine Grove Area Joint

Somerset County: Meyersdale Joint, Turkeyfoot Valley Union

Tioga County: Jackson-Lawrenceville-Tioga Joint

Venango County: Oil City Area Joint

Warren County: Warren Borough

Washington County: Avella District Joint, Bethlehem Joint, Greater Monongahela Area Joint

Westmoreland County: Arnold City, Rostraver Township, Washington Township, West Newton Borough

York County: Hanover Borough, Northeastern, Red Land, West York Area Joint, York City, York Suburban Joint

APPENDIX H

VALIDATION CHECK LIST

Item

1. What do you do when the students are using the programmed materials?

2. Do you have clerical assistance?

3. Did you have an in-service program on programmed instruction before you started to use these materials?
   a. How extensive?
   b. Who conducted these sessions?

4. Were you sympathetic to programmed instruction when you started using these materials?

5. Who selects the materials to be used?

6. Must students be in a certain grade to use a specific program (e.g. must a student be in ninth grade to use TEMAC Algebra I)?

7. Where can the students use these materials? Place(s) or location(s)

8. How do you assign programmed instructional materials?

   a. For the entire program?
   b. Complete specified frames by specified time?
   c. Up to and including chapter test? (upon completion, student must wait for the rest of the class)
   d. Only for the class period?

9. What happens when a student satisfactorily completes

   a. the program?
   b. the program with mastery?

11. When can the students advance to the next unit or chapter?

    What are your requirements?

12. Are materials always available for students when they are ready to proceed to the next unit or chapter?

13. Did you obtain permission from the administration before you started using these materials?

14. Did you obtain parental permission in each case before adopting this approach to teaching?

15. How do you report student progress on the report card? (Obtain copy of the report card if different from the report card used for nonprogrammed students.)

APPENDIX I

Progress Report to Parents
(used by one school system in Pennsylvania)

TEMAC ALGEBRA I

Name______________________ Grade/section________ Homeroom________

Achievement

Test Number	1	2	3	4	5	6	7	8	9	10	11	Total
Per cent correct												

Average number of tests taken by the class 5

Average of per cent correct for the class 83

Progress

Frames Completed
as of Nov. 1, 1962 __________

3800 -
3500 - 3799
3200 - 3499
2900 - 3199
2600 - 2899
2300 - 2599
2000 - 2299
1700 - 1999 ← Class Average (1885)
1400 - 1699
1100 - 1399
800 - 1099
500 - 799

Please note: To be on schedule each member of the class should have completed 2000 frames by Nov. 8.

Teacher's Remarks:

____
Teacher's Signature

Parents' Remarks:

____
Parents' Signatures

TEMAC ALGEBRA II

Name____________________ Grade/section________ Homeroom________

Achievement

Test Number	1	2	3	4	5	6	7	8	9	Average % correct
Per cent correct										

Average number of tests taken by the class 7

Average of per cent correct for the class 84

Progress

Frames Completed
as of Nov. 1, 1962 __________

2200 - 2399
2000 - 2199
1800 - 1999
1600 - 1799 ← Class Average (1650)
1400 - 1599
1200 - 1399
1000 - 1199

Please note: To be on schedule each member of the class should have completed 1700 frames and taken 7 tests by Nov. 8.

Teacher's Remarks:

____
Teacher's Signature

Parents' Remarks:

____
Parents' Signatures

APPENDIX J

Commonwealth of Pennsylvania
Department of Public Instruction
Box 911, Harrisburg

STUDENT ATTITUDINAL QUESTIONNAIRE

We have learned recently that your class has been using programmed instructional materials as part of this course. Will you please tell us how you feel about the use of these materials by completing this questionnaire.

Please indicate for each statement whether you "STRONGLY AGREE" (SA), "AGREE" (A), "DISAGREE" (D), or "STRONGLY DISAGREE" (SD). Circle the abbreviation which shows how you feel.

EXAMPLE:

Programmed instruction is different from conventional textbooks and conventional classes.* SA A D SD

*For the purpose of this questionnaire conventional classes shall mean classes in which you are not using programmed instructional materials.

	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
1. Programmed instruction has caused me to ask more questions than was customary under conventional instruction.	SA	A	D	SD
2. I feel that programmed instruction has made the teacher more effective.	SA	A	D	SD
3. I like programmed instruction more than I like conventional instruction.	SA	A	D	SD
4. Programmed instructional materials are more helpful to me than conventional textbooks.	SA	A	D	SD
5. When using programmed instruction, I use more reference books than I normally use in my other classes.	SA	A	D	SD
6. Programmed instruction has caused me to do more individual study projects than I would normally have done.	SA	A	D	SD
7. I am able to do more assignments by myself because of my experience with programmed instruction.	SA	A	D	SD

		STRONGLY AGREE	AGREE	DIS-AGREE	STRONGLY DIS-AGREE
8.	I would like to use programmed instructional materials in my other classes.	SA	A	D	SD
9.	I like courses that use programmed instruction.	SA	A	D	SD
10.	I would use programmed instruction if I were teaching.	SA	A	D	SD
11.	I hope that I have at least one course next year that uses programmed instruction.	SA	A	D	SD
12.	I am going to recommend programmed instruction to my friends.	SA	A	D	SD
13.	Programmed instruction should be used in my other courses.	SA	A	D	SD
14.	Programmed instruction allows the teacher to spend more time with individuals or small groups of students than is done in conventional classes.	SA	A	D	SD
15.	Programmed instruction has helped me to read better.	SA	A	D	SD
16.	I find that programmed instruction is a boring method of learning.	SA	A	D	SD
17.	Even though programmed instruction permits the student to learn by himself, I feel that a teacher must be available for:				
	Individual help	SA	A	D	SD
	Periodic lectures and demonstrations	SA	A	D	SD
	Discussion session	SA	A	D	SD

Teacher's Code ____________

Student's Grade ____________